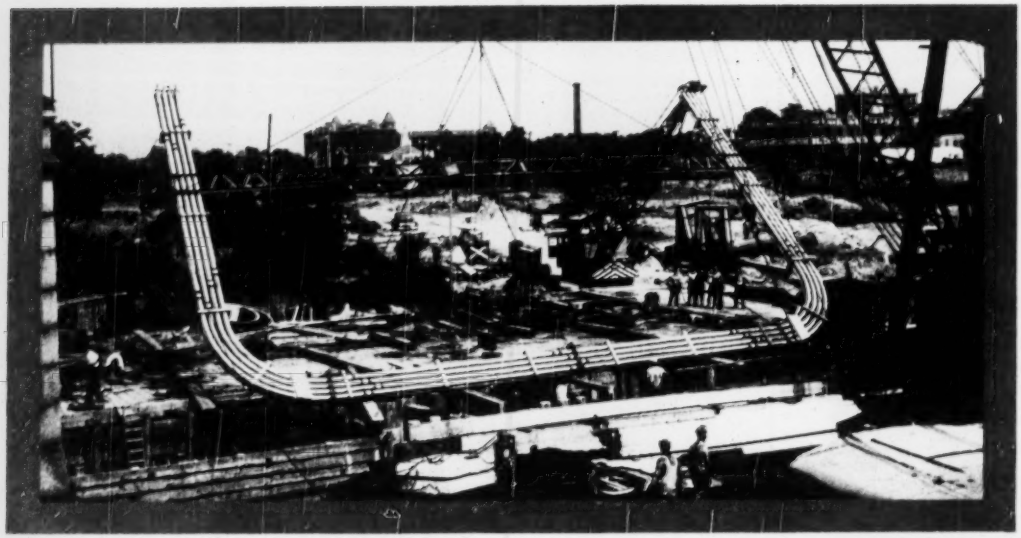
ENGINEERING NEWS-RECORD

A McGRAW-HILL PUBLICATION



Another "Underwater Bridge" for Electrical Lines Uses

BYERS WROUGHT IRON

Safe conduct for vital power and communication lines at the new Unionport bridge, Buckner Boulevard, Bronx, New York, is provided by an interesting conduit system of Byers Wrought Iron pipe.

Eight U-shaped conduits, each made up from 5-in. extra heavy galvanized Byers Wrought Iron conduit welded together in specially designed, close-tolerance coupling sleeves, form the assembly. Reinforced with a 4-ton spreader, the giant "U," 75 ft. wide and 40 ft. high, was lifted by derrick barge and lowered into position in a 2-ft. clearance space between the old bridge piers and the new coffer dams. The bottom run is located 5 ft. under the bottom of salty Winchester creek, shielding the power and telephone cables from breakage by dragging anchors — previously a frequent occurrence. The brackish water creates a serious corrosive condition, which dictated the selection of wrought iron. The work was done under the direction of Hon. Frederick H. Zimmuhlen, Commissioner of the Dept. of Public Works, New York City. Contractors were Peter V. Connolly Co. and Senior & Palmer, Inc.

There is plenty of engineering precedent to support the choice of wrought iron for this demanding service. Over 3 miles of 3"-inch black wrought iron pipe, assembled with threaded couplings which were fillet welded to reinforce and seal the joints, were used in a crossing of the Calumet River near Chicago. The conduit was filled with light mineral oil, to prevent condensation and to signal any leaks. An inspection after 13 years of service found the installation still functioning perfectly. No loss of oil had occured. Several similar installations have been made in various sections.

Wrought iron intended for conduit use should be so specified, as the threading is different from that used on pipe, and extra care is taken to avoid rough spots that might interfere with pulling of the cable. The high degree of corrosion resistance comes from the unique structure and composition of the material. Tiny fibers of glass-like silicate slag, threaded through the body of high purity iron, halt and disperse corrosive attack, and so discourage pitting. The fibers also anchor the initial protective scale, which shields the underlying metal.

Several Wrought Iron Cable Conduit jobs, both under-water and underground, are described in our bulletin, WROUGHT IRON FOR UNDERGROUND SERVICES. A copy will be sent to you on request.

A. M. Byers Company, Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Atlanta, Chicago, St. Louis, Houston, Salt Lake City, San Francisco. Export Division: New York, N. Y.

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Each of these job-proved Goodyear tires has a specially engineered tread and body to handle best a particular type of construction hauling need—each, in its proper type of service, cuts tire cost per mile, steps up schedules, provides longer-lasting performance. Proof is the fact: *More tons are hauled on Goodyear tires than on any other kind.* Remember, always BUY and SPECIFY Goodyear—*it pays!*

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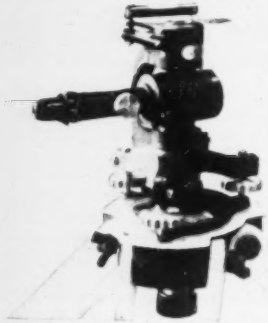

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ENGINEERING NEWS-RECORD

Volume 144 MAY 11, 1950 No. 19

WALDO G. BOWMAN
Editor

FEATURES IN THIS ISSUE

Ohio Gets Set for its Biggest Road Program 32
British Have Water Trouble 34
Up-to-Date Tunneling at Neversink 35
Simplicity Distinguishes Bascule Span ..... W. J. Deady 38
San Angelo Dam—Seven Mile Earthfill 40
To Tackle Pollution Abatement 42
"Park at Your Desk" Office Building 48
Perspective—Letter from North Carolina 156

DEPARTMENTS

Construction Week ..... 17 Education and Research 61
Construction Trends ..... 19 Men and Jobs 63
Editorial ..... 21 Heaters and Activities 72
News Outlook ..... 23 Obituary 76
Reader Comment ..... 40 Law Points 78
Developments Ahead ..... 56 Construction Reports 80
Materials Abroad ..... 58 New Products 122

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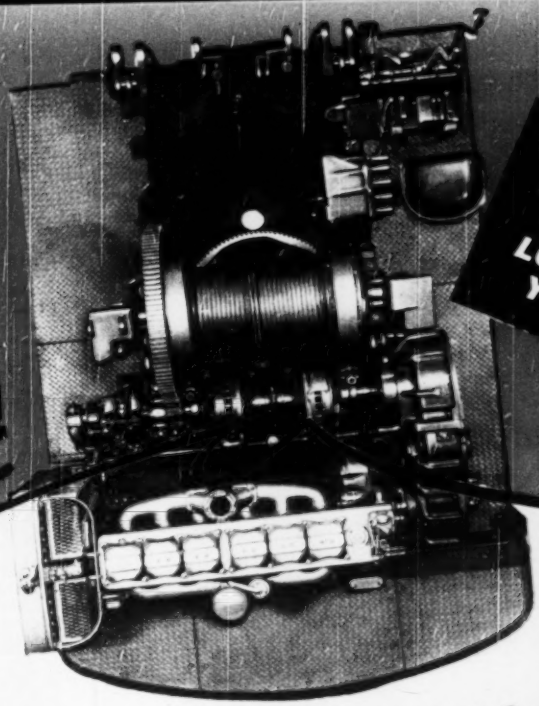
A NORTHWEST UNIFORM PRESSURE SWING CLUTCH!



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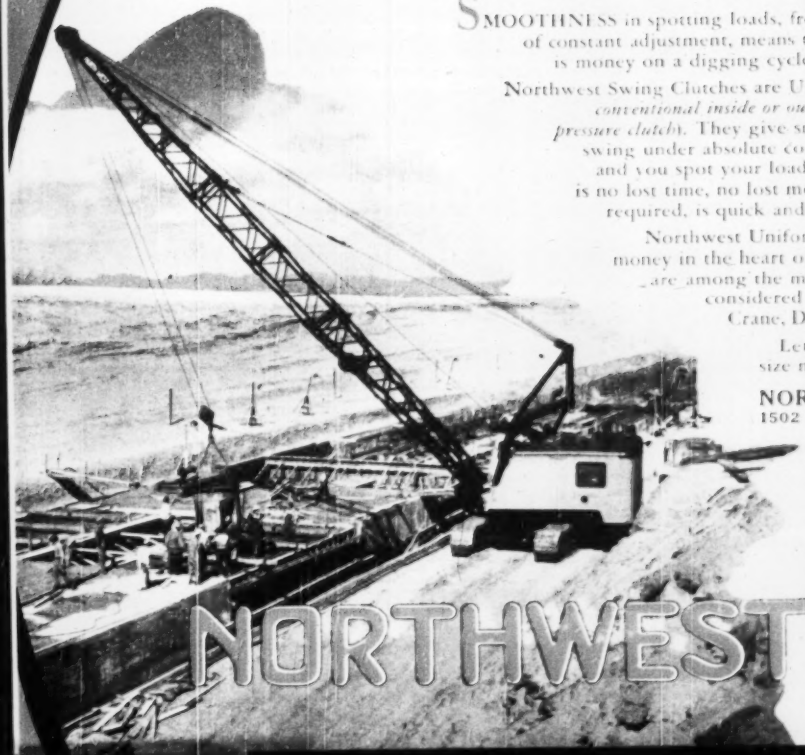
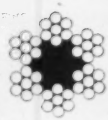
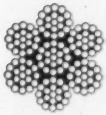


Whatever the job



6x7 rope is made with 7 wires in each of 6 strands around a fiber core or a steel core. It may be bright or galvanized steel, stainless steel or monel metal. Uses are for haulage, guying, sand lines, core barrel lines, rigging, controls, etc.

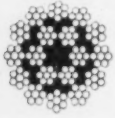


7x19 is made with 7 strands of 19 wires each, one strand forms the core. It is widely used for corrosion-resisting wire rope of galvanized steel, stainless steel and monel metal. Widely used for aircraft controls and for miscellaneous hoisting and controls.

6x19 classification is made with wire combinations varying from 16 to 26 wires in each of 6 strands. Supplied *PRE*formed or non-*PRE*formed, Lang Lay or Regular Lay, with fiber core, or steel core in bright and galvanized steel, stainless steel and monel metal. It is one of the most widely used ropes for general hoisting, cranes, excavating equipment, haulage, mining, logging and rotary drilling. Illustrated is a cross-section of 6x19 filler with I.W.R.C.

select the right wire rope for your equipment from

6x37 group has various types with wire combinations ranging from 26 to 46 wires in each of 6 strands. Supplied *PRE*formed or non-*PRE*formed, Lang Lay or Regular Lay, with fiber core or steel core. It is extremely flexible and has many uses for hoists, ladle cranes, coal cutting machines, winches, dredges, excavating equipment, etc. Illustrated is a cross-section of 6x41 I.W.R.C.



18x7 is made as illustrated with 18 strands of 7 wires each and supplied *PRE*formed. It is a non-rotating "Kilindo" rope made by combining two opposing lays of rope. Its principal use is for hoisting with a single line to overcome rotating or spinning of the load. It is desirable for small shop and warehouse electric hoists, and for sewer, subway and mine shaft work.

8x19 is an extra flexible rope made in various wire combinations. It is used in iron and special traction grades for passenger and freight elevator service, and in Monarch Whyte Strand Improved Plow Steel for many and varied purposes where the rope is not subjected to heavy crushing loads. Illustrated is 8x19 Seale Special Traction Elevator Rope.

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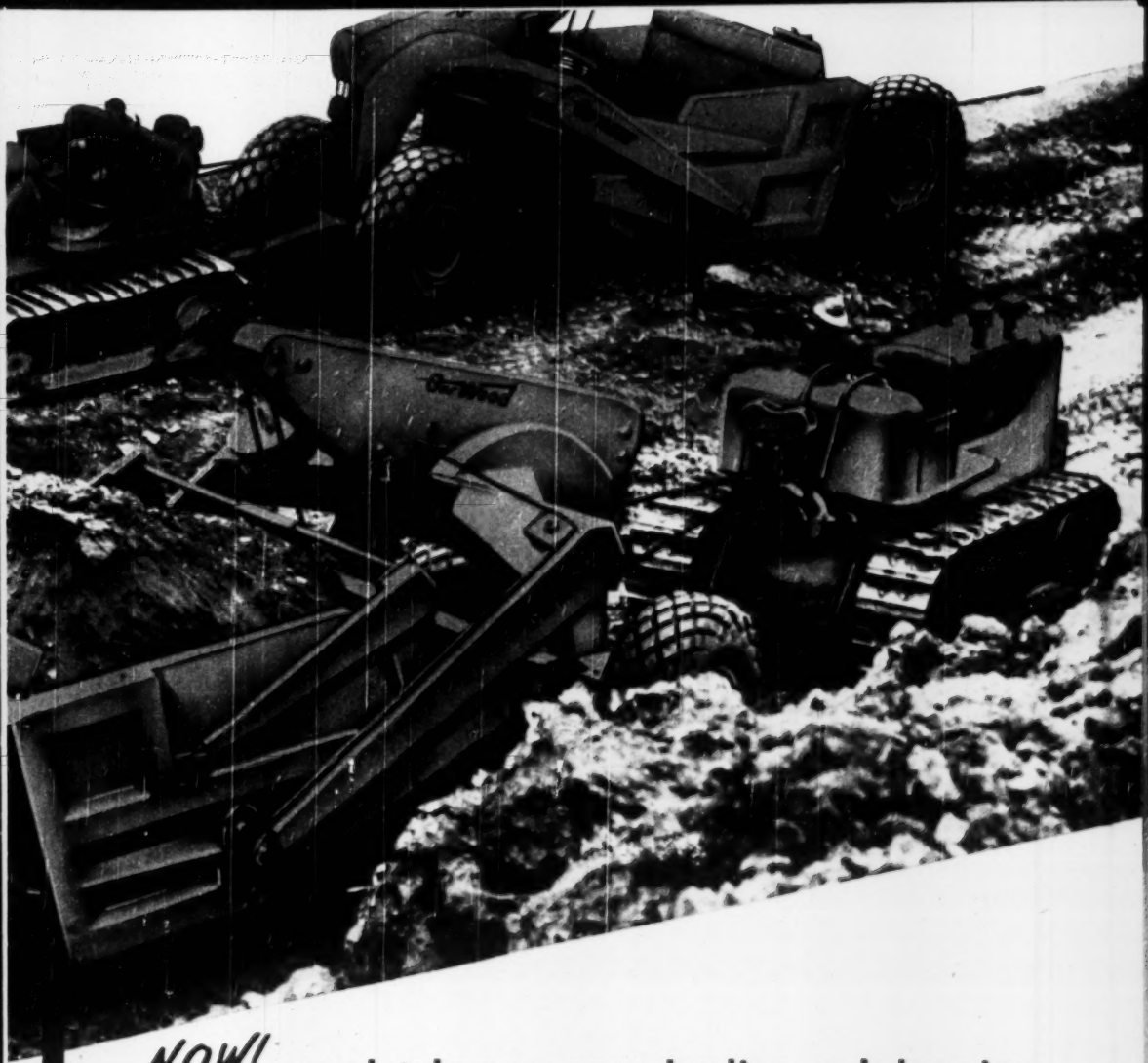

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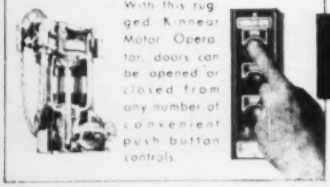

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NEWS BRIEFS

Who'd Live There?—New Jersey's Governor Driscoll says the state plans to help build a "television city" on the marshes near Hackensack, about five miles from New York City. The idea is for the state to acquire the site, put in roads and parking sites, then leave the remainder of the job to private enterprise. The center would combine complete facilities for television programming and transmitting. TV industry leaders suggested it.

Army Orders—Boston must start a $5,000,000 suspension bridge between Chelsea and East Boston by July 1 to comply with War Department orders, according to Mayor J. B. Hynes. It's to replace the existing Meridian Street bridge which the Army ordered out more than a year ago.

No Mud Problem, Anyway—Virginia highway engineers say the bridge problem has replaced the "mud problem," and they estimate it'll take $50,000,000 to solve it. The state has 6,822 bridges of 20 feet or longer.

Problem Solved—Dallas, Tex., city council got action when it warned home builders to do something within 90 days about the negro housing shortage or face city action toward more public housing. Builders promised to build 5,000 homes for negroes. Forty members of the Dallas Home Builders Association signed an agreement to build from 20 to 100 homes apiece.

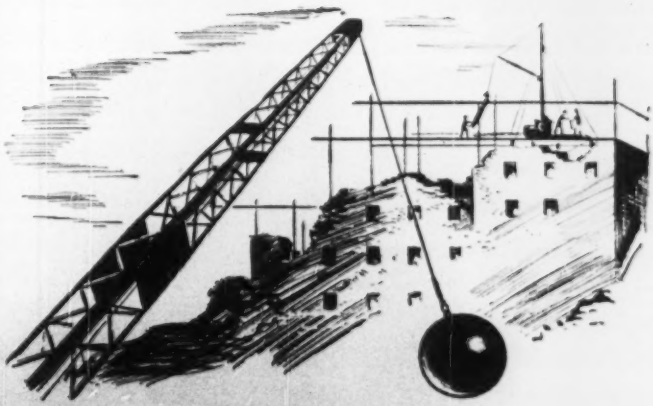
High Gear—North Carolina's Highway Commission had 132 rural road jobs under contract at mid-April, but didn't expect the $200 million program to reach its peak until mid-summer. Prices have been good and competition sharp. More than $41,000,000 of the first $50,000,000 of rural road bond money has been allocated.

Business Backlog—New York State is committed to a $146 million town highway improvement program to start in 1952 and run for 10 years. The state will pay half. It's object: to bring town highways up to date for efficient farm-to-market transport.

Just Don't Land—That helicopter which Chicago uses to collect Lake Michigan water samples (ENR April 20, p 25) was temporarily out of action soon after it began operating. Always hit the craft as it landed two miles off the 79th Street filtration plant. The rotor was damaged so badly that

Continued on page 11

Roebling Preformed Extra Lay "Blue Center" Steel Wire Rope lasts longer, brings fewer shut-downs, cuts down replacement time, saves wire rope dollars.



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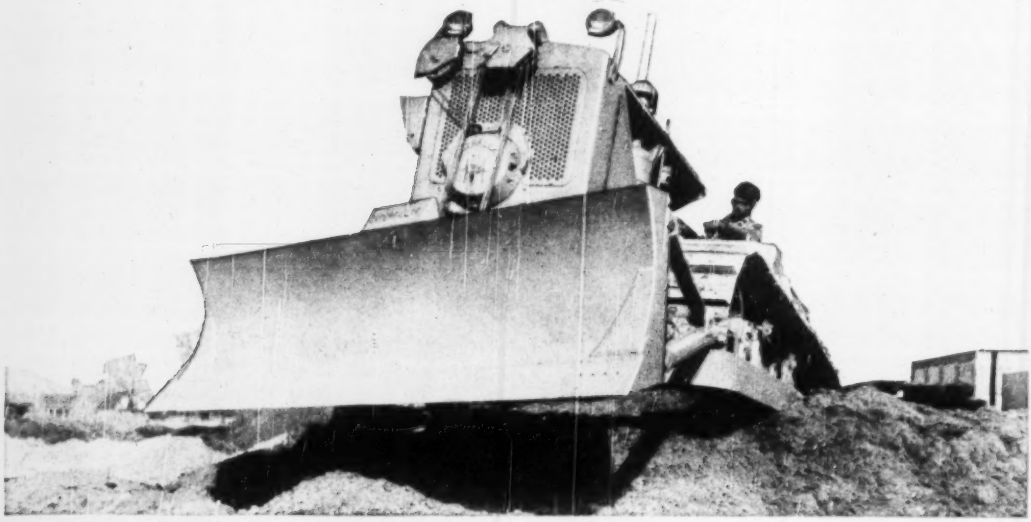

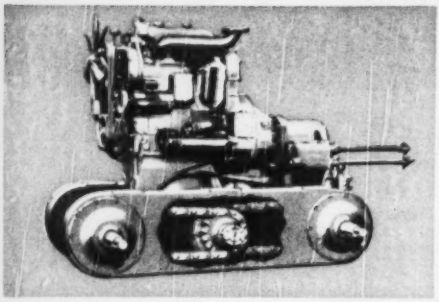

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(Continued from page 8)

a Coast Guard cutter had to tow it in—from four miles east, where it had drifted.

Sooner the Better—The 160-mi. eastern extension of the Pennsylvania Turnpike is expected to be opened Oct. 1. It is well ahead of schedule and some officials hint it may be finished in time for Labor Day use.

Anti-Flood Front—Massachusetts Gov. Paul Dever has asked the legislature to ratify two compacts aimed at controlling floods on the Connecticut and Merrimack Rivers. One would cover Massachusetts, New Hampshire, Vermont and Connecticut, the other Massachusetts and New Hampshire. Joint action by the states, he said, would open the way to federal participation, adding power, recreation and irrigation to potential benefits.

Finishing Hospital Job—Veterans Administration will have the largest hospital program in history entering its final stage at the end of the year. All but three of 67 new hospitals will be built or building then, VA says, and plans for 15 of the last 14 hospitals will have been completed.

Why Not Everywhere?—The Maine Turnpike, Kittery-Portland toll road, has saved almost $1,000,000 in its first two years—if you figure the lives and man-hours saved. Executive Director William B. Getchell points out that only two lives have been lost on the road, adds that if it were subject to the same fatality rate of the alternate, free route (Route 1), the toll would have been 14 deaths.

Swords to Plowshares Note—North Carolina Highway Engineer W. H. Rogers is anxious for further data on the use of chemicals to form soil binders. Both Army and Navy have been experimenting with the problem (ENR March 23 p. 26; March 16 p. 25). North Carolina used resin successfully before the war, but was troubled by its cost and the necessity for using a different formula for each type of soil.

Boston Shakeup—Public Works Commissioner George C. Holland, of Boston, has abolished the city's highway division and transferred its executive to other duties. Its employees and those of the bridge and ferry division were merged into a new bridge and highway group. The moves followed an investigation by the city finance commission into allegations of irregularities in street construction. Widespread reconstruction is continuing.

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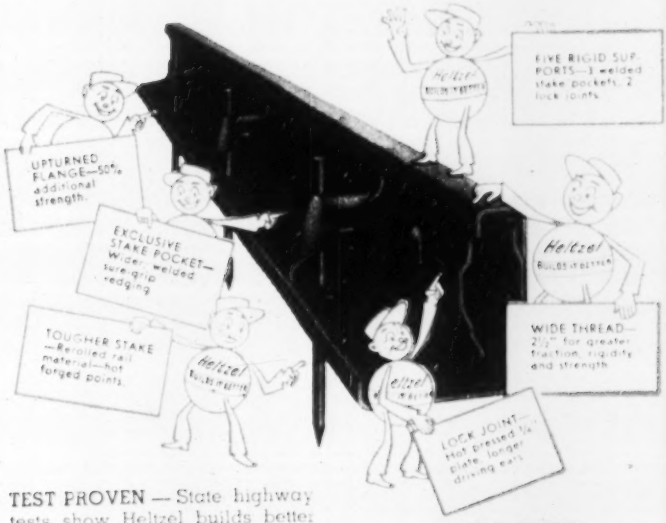
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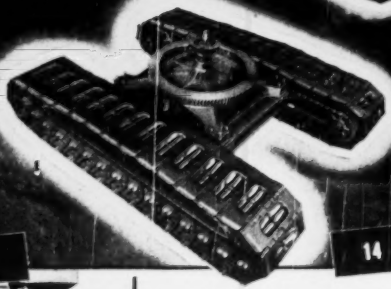

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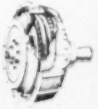

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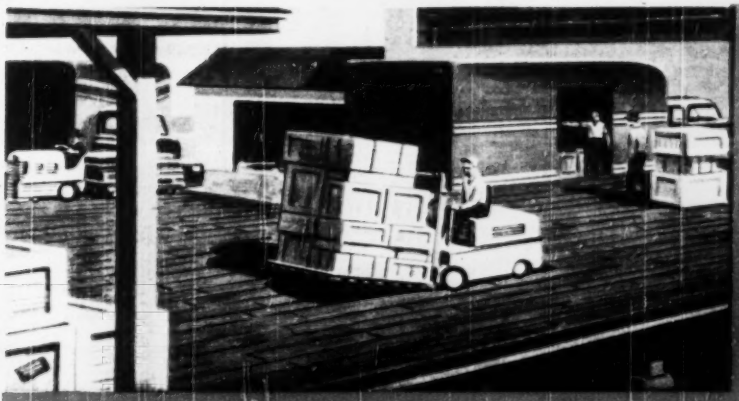

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PENTA is a dependable wood preservative. It preserves wood under the most adverse climatic conditions. PENTA-PROTECTED WOOD is economical, pays for itself many times over in longer life and lowered maintenance costs.

Ask your lumber supplier for PENTA-PROTECTED WOOD. If he can't supply you, write to Dow, Dept. PE-19A for the name of the source nearest you.

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Utility companies *must* be right when they choose a wood preservative. Many utilities are switching to Penta for treating poles and crossarms—proof of the value of PENTAchlorophenol.

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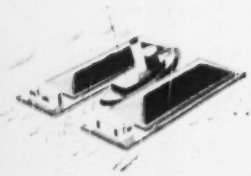
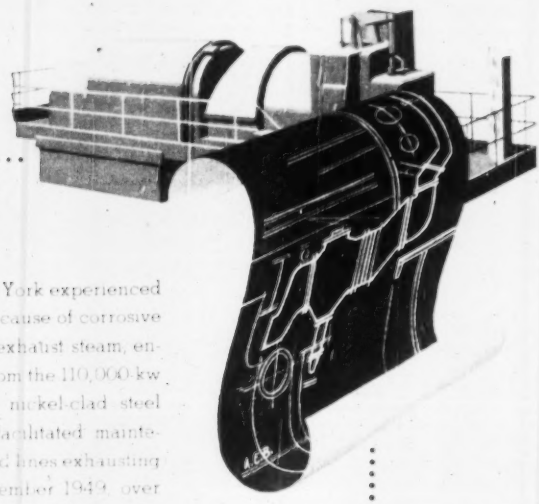
DEDUCTING MAINTENANCE

...or how to insure long life in high-temperature exhaust ducts

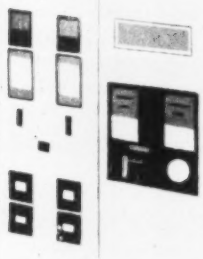




A Consolidated Edison Company plant in New York experienced costly failures in atmospheric exhaust ducts because of corrosive and erosive action developed in discharging exhaust steam, entrapped gases and chlorinated salt tidewater from the 110,000-kw turbines and auxiliary equipment. In 1946, nickel-clad steel ducts were installed. Their modern design facilitated maintenance by permitting shorter flanges for two feed lines exhausting from the auxiliary lubrication pumps. In December 1949, over three years later, the ducts were found to be in excellent condition, and savings had more than returned original installation costs.

Such strides in equipment design in the last two decades have resulted in increased efficiency ... lower maintenance and operating costs ... improved performance. Many of the improvements have been the result of the cooperation between engineer, designer, fabricator and materials supplier. We call this *Lukenomics*. Such an approach is at your disposal to help solve your cost and amortization problems along with other vital considerations.

To obtain the advantages of equipment built by fabricators applying the Lukenomics principle, write our Manager of Marketing Service, Lukens Steel Company, 513 Lukens Building, Coatesville, Pennsylvania.



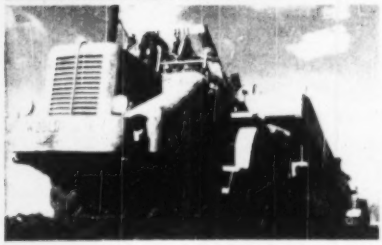
A nickel working surface is so satisfactory for exhaust duct service that Consolidated Edison Company of New York is standardizing on this design. For maximum economy the ducts are fabricated of Lukens Nickel-Clad Steel.

LUKENS

LUKENS STEEL COMPANY

BETTER PRODUCTS FOR BETTER EQUIPMENT

Ten Terra Cobras Lick Alaska Mud



Over two million yards of earth to be moved under near-flood conditions—that's the nutshell story of the Fairbanks International Airport job. Ten big Wooldridge Terra Cobras were brought in to carry the bulk of the load. To reach the job, they travelled 500 miles of barely passable roads under their own power from the Valdez docks. Good organization and round-the-clock Cobra dependability kept operations on schedule with remarkable records for yardage output during the abnormally wet, short 1949 season. They'll help bring the job to completion in 1950. Performance under tough job conditions like these keeps users "sold" on profit-making qualities of the Terra Cobra. Ask your distributor or write today for Bulletin TC-705. See how the new Model TC-S142 can boost your profits. It's *proved* for dependability, *improved* for even greater production, *approved* for easier maintenance.

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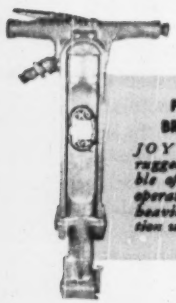

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JOY K-81, a rugged tool capable of sustained operation on the heaviest demolition work.

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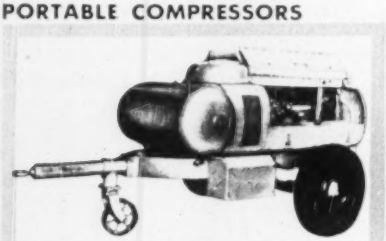
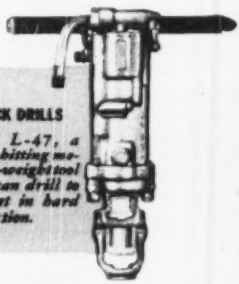
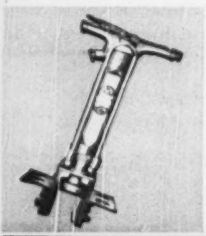




ROCK DRILLS

JOY L-47, a hard-hitting medium-weight tool that can drill to 10 feet in hard formation.



SHEETING DRIVERS

JOY Q-81, an adaptation of the K-81 for driving wood or light steel sheeting.

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JOY C-85, an easy tool to handle, yet delivers powerful blows for faster tamping.

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THE CONSTRUCTION WEEK

SEAWAY OFFENSIVE, II—Prospects of favorable action on the long-argued St. Lawrence Seaway (ENR May 4, p 17) zoomed suddenly upward last week under the impetus of a major force that has been lacking—big business. For many years, big business had been discreetly neutral or much opposed, while the Seaway ball was carried by politicians and the perennial advocates of inland waterways. But last week, representatives of all but two of the big steel companies appeared before the House Public Works Committee to push for the project. Reason: The steelmen have heavily backed the exploration of the vast undeveloped ore deposits in Labrador, and want to use their big ore-carrying freighters to bring the ore into the Great Lakes as replacement for the dwindling Mesabi Range ore. With such backing (National, Republic, Wheeling, Youngstown, Armco) observers see the Seaway proposal coming off the Congressional shelf and moving up into the "likely" brackets.

BETTER CLIMATE—In line with the prospects for the St. Lawrence is the opinion that the administration's attitude toward business is getting a lot friendlier. The big gains in employment, and continuing strength in construction, steel, autos have about persuaded the government that if there is any slide in the fourth quarter, it'll be slight. The change in feeling may keep down the election-year heckling that might come if any recession were in sight.

MORE POWER FROM NIAGARA—The Senate is now considering a request from President Truman for fast action on a new U. S.-Canada treaty that will make possible development of more power from Niagara Falls (without detriment to the falls as a scenic attraction). Most observers think approval will be forthcoming; Chief opponents have been private power interests at the falls, who anticipate that additional water will be assigned to public power development.

GLASS FOR THE GLASSLESS?—That virtually wall-less, actually window-less factory that Corn Products Refining Co. finished at Corpus Christi, Tex., a short while ago (ENR Nov. 24, 1949, p 42) won't be that way long. Rumor is that windows will be installed. Climate is swell, but too windy.

WHAT'S THE LIMIT?—San Joaquin Valley farmers who have carried their fight against the Bureau of Reclamation's actions at Friant Dam in California to a federal district court, got a definition of the issue last week. The 1,100 farmers charged that the Bureau deprived them of their water rights by diverting Friant Dam water into the Kern County canal and watershed, demanded an injunction to halt the diversion. The bureau's attorney's replied (among other things) that the federal government could impound water without condemning property below the dam, and that the farmers had shown no sufficient cause of action. The court denied the injunction without prejudice, to allow the farmers to amend their complaint. In its denial, the court delivered a stinging slap at the bureau. Said Judge P. M. Hall: "If the case were dismissed, it would allow the bureau to divert every stream in the West. The Reclamation Bureau has exceeded its authority . . . by its attempt to take the water rights of the farmers without compensation."

CUT-OFF CUT OFF—Homebuilders who were working up to a full-scale campaign to halt Veterans Administration plans to terminate combination VA-FHA mortgage loans before the official cut-off date of Dec. 31, had their guns spiked last week: VA announced it would chop the loans as of Oct. 20. The 1950 Housing Act authorized the action, if the VA administrator saw fit; homebuilders charged such action would slow home sales to ex-GI's (ENR May 4, p 17). There's no forecast of the effect, but government housing people lean to the belief that the cutoff will cause no slowing in residential construction.

37½-HR WEEK?—The 37½-hour work week may become a future Truman policy, Washington thinks. But it won't be pushed now, so long as the unemployment figure keeps below the 5,000,000-mark. Effect of a cut in working time can be gaged by recent figures of economists, who figure a cut-back to 37½-hours would create 2,000,000 more jobs.

MONEY GOING UP—It will cost you more to borrow money in coming months: Commercial banks are planning to raise their rates on short-term loans. Upward pressure comes from: Business firms, which are currently borrowing at higher-than-normal rates to buy goods they need to keep sales high; insurance companies are selling government bonds to get cash for mortgage lending. And the federal government itself is now borrowing about $100 million in new money every week—by issuing that much more in new 90-day bills than it retires, with Treasury paying increasingly more in rates for this money.

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PULL IT
RE-DRIVE IT

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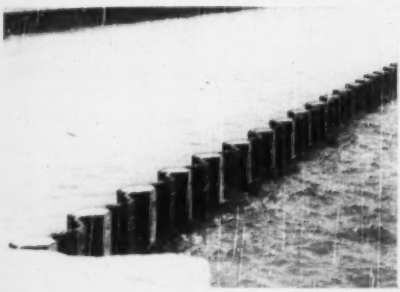

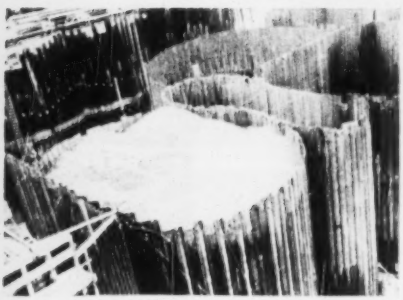

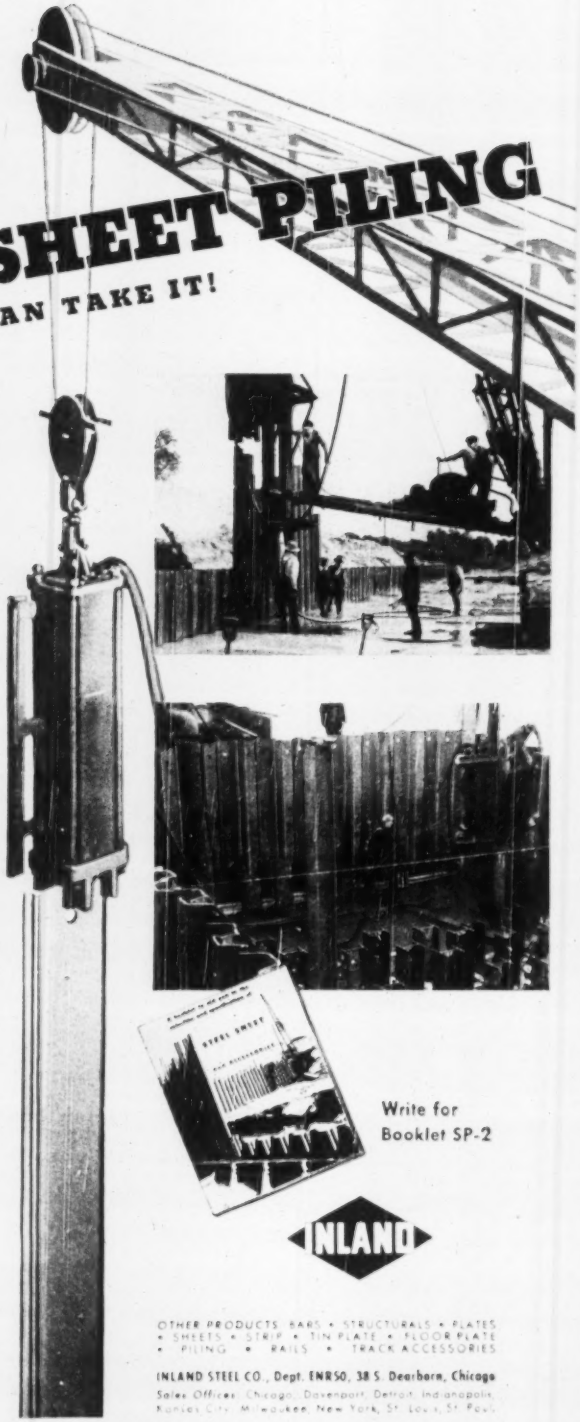

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CONSTRUCTION TRENDS

NEW BUILDINGS PAY OFF

Here is a fresh approach to figuring the cost of a new industrial plant—and one that the construction industry can turn to its advantage.

Outlined in FACTORY MANAGEMENT AND MAINTENANCE, McGraw-Hill's monthly magazine for top industrial management, the idea is to figure the cost of a new plant as part of total manufacturing costs. In short, the idea is to ask: What will a new plant contribute to profits?

In the past, most manufacturers haven't had a yardstick to use in figuring what a new plant would add to their operations, profit-wise. Big companies had, of course, built up some experience of their own that was a useful guide. But most companies—particularly the small ones—simply built a plant when they needed it to expand operations. Generally they haven't considered the possibility of replacing old buildings with new simply because new ones could save money.

FACTORY's approach to the problem, though, shows how a new plant can pay off all along the line—in saving on materials handling costs, supervision, inventories, maintenance and other manufacturing costs.

Here's how savings worked out in eleven companies:

Cost of Plant	Annual Saving	Years to Pay Off	Increase In Output per Manhour
200,000	$40,000	25	10%
616,267	50,000	10–15	7%
875,000	50,000	20	10%
900,000	40,000	8	NONE
950,000	X	15	25%
1,300,000	NONE	12	10%
1,500,000	X	X	8%
1,884,752	800,000	8½	50%
2,400,000	250,000	X	X
3,000,000	400,000	10–15	8%
6,000,000	X	10	10%

(X=no answer)

These were postwar plants, built to (1) centralize operations, or (2) to expand capacity, or both. They were not designed primarily to save on operating costs although the table shows that on the whole they racked up impressive savings.

This table doesn't reveal all the complications involved—and it doesn't show all the benefits. These companies increased their production capacity by from 20% to 300%. That means that their overall costs for things like lighting, heating, and inventories went up in many cases. That complicates FACTORY's report.

It's also difficult to know—although in almost every case companies believed they benefited—what was the pay-off in things like improved worker morale and improvements in quality of product.

In trying to get a simple yardstick, FACTORY showed that the **annual cost** of these plants was, on the average, 6.6% of company payrolls. In another group of plants reported in FACTORY, annual costs averaged 5.1% of payrolls.

Figured that way, the table indicates that almost every one of those plants is paying back its costs year by year from the improvement in output per worker it made possible.

What does all this mean for construction?

This is the first attempt at a yardstick that will give contractors and engineers a powerful sales argument. The big market in industrial building is in replacing old buildings and obsolete buildings with new. New building simply to expand capacity, although it has been the biggest part of the market in past years, will be comparatively small in the future. Currently, according to McGraw-Hill's survey of business plans for investment in new plants and equipment, business is using two-thirds of its funds to replace and modernize old facilities. Only one-third is going to expand capacity.

The possible market is huge, particularly in the eastern part of the United States. New England cities, for example, are filled with old brick and stone factory buildings, many of them built before 1900. They are multi-storied, were not designed to handle materials in the volume that is necessary today, and are not easy to adapt to modern manufacturing.

Many of these old buildings, too, are set in the midst of highly congested areas where movement of freight in and out of the plant is costly.

Since the war, industry's incentive to build new, efficient buildings has increased sharply. Hourly wages in manufacturing are more than double what they were in 1939, while prices are up far less. Increasing competition, too, is putting a premium on efficiency. And more and more manufacturing processes require controlled conditions, for example, regulation of air temperatures or humidity.

To develop the replacement market, engineers and contractors need a yardstick—a way of showing industry how a new building can pay for itself by cutting operating costs.

This is the first time—in anything more than isolated instances—that evidence showing how new buildings can be profitable has been put together.

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SEND for TYLOX BROCHURE

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Better Pollution Control

WHEN IT COMES to pollution abatement, California is keeping step with her traditions—that of doing big things boldly. Departing sharply from accepted practice, the Water Pollution Control Board has decided that abatement requirements are to be based on the use to which the water under treatment is to be put, instead of on some arbitrarily fixed requirements. The state has been divided into regions, generally on a watershed basis, with standards in each region to be set by a local board familiar with local needs.

Members of the board state frankly that the program is experimental. Hence the board will welcome comment from anyone whose experience may be helpful to it in developing a control system that will attain the boards objectives and still be equitable.

The board deserves encouragement in what it has undertaken to do. Pollution-control requirements that are set on a state-wide or regional basis tend to be too high. Too frequently they have been prescribed by persons to whom pollution control means elimination of all pollution. As a result, industries and sometimes whole communities can be required to make costly investments to produce a cleaner effluent from their treatment plant than is required by the condition or use of the stream into which it flows. That is an economic waste. Such unnecessarily high requirements also check progress and make it difficult to get cooperation in effecting the control program. The California plan is designed to avoid such difficulties.

Chuck-Holes and Pavement Striping

THE ACCUMULATED wintertime urge for accelerated driving by the average motorist—both in speed of driving and distance traveled—is suddenly apparent with the advent of spring weather and open roads. To protect these drivers, maintenance engineers are actively engaged in repairing the ubiquitous "chuck hole"—one of the deadliest of hazards to the high-speed motorist. In many states this problem appears to be more serious than usual this year, yet there is ample evidence of extraordinary efforts to eliminate that danger quickly.

Unfortunately, there is less evidence of similar activity in expediting the painting or repainting of center lines and no passing lines. This apparent apathy on the part of some states, counties or city administrations is serious. It probably is in part responsible for the increased number of early-spring accidents on highways.

Pavement stripers admittedly are an expensive item in any equipment inventory, but there is little excuse for not operating them each daylight hour, weather permitting, or even around the clock if properly lighted.

All signs point to greater traffic density on our highways this summer. If a continued sharp rise in the accident rate is to be avoided, all maintenance operations such as filling holes and renewing the lane markings should be completed as soon as possible.

How Much Road Work?

ESTIMATES of the amount of road work needed to make our highways adequate for today's traffic have risen in the past year or so to staggering figures. Most recent estimate is that of the Congressional joint Committee on the Economic Report, which set the total at $41 billion.

That our highways in many places are inadequate for current traffic is evident to anyone who travels around the country in a motor car, yet it does not seem probable that they can be as hopelessly obsolete or broken down as that figure would indicate. Pavements are poor in many places and aggravating delays are encountered in and around most cities due to traffic congestion. But on the other hand one can drive mile on end at high speeds with safety and reasonable comfort in many regions, even through some densely populated areas. Where then can explanation be found for this great difference between observed conditions and estimates of highway needs?

Considerable light was cast on that question by C. H. Buckins, assistant chief engineer of the Pennsylvania Highway Department, at the Highway Transportation Congress in Washington in April. He said it was a case of planning to buy a $100 suit when you can only afford a $60 one.

Citing the estimate of the Bureau of Public Roads that it would require $41 billion to bring the Interstate Highway System up to minimum standard set for that system, Mr. Buckins said that Pennsylvania would have to spend $927 million if it built the 1,026 miles of the systems within its borders to those standards. But meeting those standards, he said, frequently would mean building four lanes where current traffic could be handled adequately by a two-lane road. To meet "practical and tolerable standards", on the other hand, would only require the expenditure of $270 million on 594 miles.

If the type of thinking that has been applied to Pennsylvania's highway requirements could be applied in each state, Congress and the Bureau of Public Roads would have a much more accurate picture than they now have of actual road need on which to base a logical road building program for the years immediately ahead. Meeting the most urgent needs is the task for today and we should have some measure of its magnitude. Refinement—the $100 suits—can come later.

Ten Years Ago...

A Decade of ATLAS DURAPLASTIC AIR-ENTRAINING PORTLAND CEMENT

this test paving was laid in Minneapolis—the first commercial use of Atlas Duraplastic air-entraining cement. Badly scaled background section was made with regular cement. Foreground concrete was laid at the same time with Duraplastic. Here are both sections, photographed ten years later, after ten severe winters, heavy applications of de-icing salts and many freezing-thawing cycles—convincing proof of Duraplastic concrete's lasting durability. Longitudinal structural crack shows some raveling. Note perfect transverse joint.

Today...

Promontory Apartments, Chicago, Ill. Duraplasticized throughout in concrete columns 32 feet deep, with network of steel bars and beams. No sign of water gain or segregation. Curtain wall rests on concrete surface free of blemishes. Architect: Mies van der Rohe. Associate: Pereira, Ostrand, Rissamp & Tay Ltd., Chicago. Engineer: Frazier Kamcke. Contractor: Peter Hansen Construction Company—all of Chicago.

for extra durability . . . modern structures are built with ATLAS DURAPLASTIC*

That first test paving began a new era in concrete construction. As successful installations with Atlas Duraplastic have multiplied, so have the number of engineers and contractors who rely on its extra durability and improved performance for structural work. An outstanding example is this new apartment building, designed for simple beauty, constructed with Duraplastic by the most modern, economical methods.

Over the last ten years, Duraplastic's advantages have been applied to all types of mass and structural concrete—for foundations, walls, columns, and floors. It's ideal for slip-form, gunite, stucco and similar uses.

With Duraplastic, less mixing water is needed for a given slump. The resulting mix is more plastic, more workable, more uniform and more cohesive. It's easy to place and finish. Water gain and segregation are reduced. Surface appearance is improved and has higher resistance to the effects of weather-exposure.

For structural concrete needs of today and tomorrow, Duraplastic offers better concrete at no extra cost. It provides the precise amount of air-entraining agent interground with the cement for satisfactory field performance. It complies with ASTM and Federal Specifications, sells at the same price as regular cement and calls for no unusual changes in procedure.

Send for new free booklet, "A Decade of Duraplastic Air-Entraining Cement." Write to Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Chrysler Bldg., New York 17, N. Y.

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ENGINEERING NEWS-RECORD

MAY 11, 1950 VOL. 144 NO. 19

Sewerage works upswing may set new dollar record

Indexes show continuing gain over 1949 record year as housing boom, clean-stream drives keep up pressure for added and improved sewerage facilities

The 1950 construction boom—which ran a new record established last month in housing starts—may see another new record set this year in sewerage contracts.

Certainly, the factors necessary to achieve a volume exceeding last year's $2[illegible] million record are present.

1. The money market is in highly favorable shape for municipal financing, whether by general obligation or revenue bonds.

2. Considerable pressure is being exerted upon municipalities by various governmental agencies above the municipal level.

3. The backlog of proposed sewerage construction is growing.

For four months of 1950, contracts are one percent ahead of the comparable period last year, a record.

The prospective record comes on top of the vast sewerage program that has gone forward since the end of World War II. There have been sewerage contracts let since 1945 amounting to $5000 million. Despite that kind of activity, U. S. Public Health Service officials say pollution is growing worse, rather than better.

Or, if the continuing frenzied housing boom would create considerable demand for new sewerage works. On the basis of continued large-scale housing construction in several years to come, prospects for sewerage business look good.

• **Plenty of money**—Depending on the credit of the issuing municipality, there's plenty of money around and it's rarely been cheaper. A week ago, the Dow-Jones municipal bond yield average stood at 2.11 percent. At the same time, the Dow-Jones municipal revenue bond average stood at 2.44 percent. Such yields to investors indicate low interest costs to sellers. Thus, a new sewerage volume record shouldn't be difficult to achieve, so far as the financing costs are concerned.

These yields will vary with the Federal Reserve Board's management of the money market, of course. And FRB tends to close money rates as inflationary dangers increase, let rates sag as deflationary forces take over. Thus, the likelihood of any real inflationary tendencies as the year goes by or the reaction from them could affect sewerage financing costs and, in turn, the 1950 volume.

Right now, though, the market for municipal securities is booming. Bond houses, which had been well loaded with such securities, had cut the supply down to $133 million last week. That's high, but a substantial drop from a week earlier. And within the next 30 days, issues totalling almost $250 million will have come to market.

• **Pressure, too**—Throughout the U. S., municipalities are under pressure by states and federal agencies to do something about stream pollution arising from the disposal of untreated sewage in public waterways. One of the most drastic of these campaigns is in full swing in Pennsylvania. There, industrial polluters and cities alike are under closed-end orders to build treatment facilities. More than 45 percent of the municipalities subject to Pennsylvania's Clean Stream Law are under such orders at the present time. (ENR March 2, p. 286).

Varying degrees of pressure are being exerted in other states, particularly where interstate compacts to abate stream pollution are operating. One of these is the Ohio River Valley Water Sanitation Commission, headquartered in Cincinnati and attempting to purify one of the most heavily industrialized and populated streams in the land.

Similar agencies are operating in New England, the New York Interstate, the Delaware Basin, the upper Mississippi River, the Missouri River, the Great Lakes Basin, the Potomac and Red Rivers, the Pacific Northwest and elsewhere.

• **Lots to do**—Right now, there's a $2.2 billion backlog in sewerage construction on the books. So far this year, it's been growing up $27,000,000 in the first quarter. That's an indicative figure, for the increase in backlog during the comparable period last year was only $2,000,000. And between April and December, 1949, the backlog dropped by $581,000,000, as work went into construction faster than new projects arose.

Regionally, changes in the sewerage

(Continued on page 24)

STRONG ROOF—H. K. Williams Co., a Louisville, Ky., contractor, took this 5-ton roller to the roof of the Brown Garage, Louisville, to help lay an asphalt coating so that a 200-car parking area could be opened there. (Courier-Journal & Times Photo)

Niagara redevelopment poses power problem

Senate gets treaty for ratification—legislation introduced calling for federal redevelopment of power

The long expected question of who will redevelop Niagara Falls power to more than treble present hydroelectric capacity of the scenic site came out in the open last week in Washington.

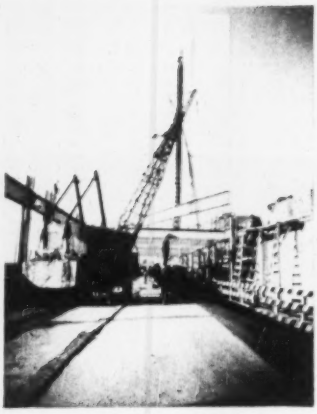
President Truman sent the Senate the treaty signed with Canada earlier this year (ENR March 9, p. 20) to reallocate between the two countries the waters of the Niagara River. Urging Senate approval of the Niagara water pact, the President also declared, "I believe that the additional power facilities should be publicly constructed, in order that the benefits of the hydroelectric power produced there can be passed on to the people at the lowest possible cost to them."

On the heels of the Presidential message came a definite proposal for public redevelopment of Niagara Power. New York Democrats, Sen. Herbert H. Lehman and Rep. Franklin D. Roosevelt, Jr., introduced a bill which would have the federal government build the new power installations and sell them to New York state. Construction would be done by the Corps of Engineers. Presumably, the purchase and operation of the new power plants would be handled by the Power Authority of the State of New York, established some years ago to operate the still-unopposed St. Lawrence River power plants.

• **Present licensee ignored.** Left out in the cold under the Lehman-Roosevelt plan is the Niagara Falls Power Co., which now operates two power plants at the Falls with a total capacity of some 440,000 kw. The company, a subsidiary of the Niagara Mohawk Power Corp., is expected to apply to the Federal Power Commission for a license to build the new facilities when the treaty is ratified. Passage of the new bill would cut out the company from redevelopment. It also would have definite implications for the company, because the 50-year FPC license for private development at the Falls does not expire until March, 1971.

Opposition to state operation of the facilities is anticipated in the bill. Portions of Pennsylvania and Ohio located relatively close to the Falls would be granted some of the new power. Final word, in case of disagreements over interstate power allocation, would be given FPC.

Congress will not approve the Lehman-Roosevelt bill now, but the plan for federal-state redevelopment will be pressed next year. It is likely to be ratified there and by the Senate.



MORE UN FACELIFTING—A roof is being erected over Franklin D. Roosevelt Drive, along New York City's East River from 42nd to 48th Streets, site of the United Nations development. The UN building is in the background. At right is part of the framework of the UN Meeting Halls building. The latter will be cantilevered over the drive to the river's edge. American Bridge Co. is the contractor.

Predict, deny salt flood in California valleys

Evan T. Hewes, president of the Imperial Irrigation District, has added a point by point refutation of a contention that southern California's Imperial and Coachella Valleys are in danger of being flooded by sea water from the Gulf of California.

Writing in *Harper's*, Alfred M. Cooper, former industrial training consultant for the Los Angeles Water Department, contended that the silt barrier deposited by the Colorado River between the gulf and below sea-level Imperial Valley is being eroded away by tidal forces. Cooper maintained that the barrier has dropped from 28 to 15 ft above sea level. "He described it as 50 mi. thick, pock-marked, but said most of the surface was now covered by a salt water lagoon."

Hewes, whose statements were endorsed by Joseph F. Friedkin, resident San Diego engineer of the U. S. Section of the International Boundary and Water Commission, said:

"The low point of the barrier is 40 ft high. The distance from sea level at the river mouth to the international boundary at Calexico is 60 mi. There has been no change in this condition in the last 75 years."

Hewes denied that any seepage is possible as contended by Cooper. Hewes said the barrier is composed of finely granulated silt and clay which make it impervious.

Sewerage record possible

(Continued from page 23)

backlog during the first quarter were these:

New England, up $1,000,000, 1 percent; Middle Atlantic, down $5,600,000, 1 percent; South, up $3,100,000, 1 percent; Middle West, up $11,900,000, 2 percent; west of Mississippi, up $16,200,000, 5 percent; Far West, up $300,000; total U. S., up $27,000,000, 1 percent. States showing the biggest gain in backlog during the first quarter were Ohio, Texas, Minnesota and Missouri. California and Michigan were reducing their backlogs in greatest proportion.

• **Proposed projects**—Indicative of the type and extent of sewerage projects facing cities are these:

Indianapolis has commissioned consultants to design additional sewers at an estimated cost of $2,000,000.

Richmond, Va., is undergoing considerable pressure for construction of sewage disposal facilities which would cost $13,000,000. Financing plans envisage a sewer tax based on water consumption.

Canton, O., has enacted an ordinance authorizing the sale of $3,100,000 in revenue bonds to finance a sewage-garbage disposal plant.

Salem, Ore., has given top priority to sanitary sewer and sewage treatment projects which would cost $1,429,000.

Marion, O., told by the state that it must modernize its treatment plant and sewerage system, plans a $500,000 revenue bond issue.

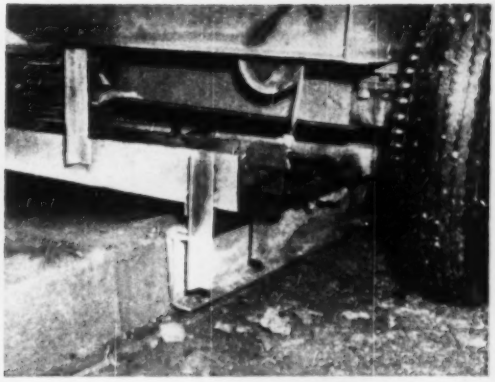
Toledo, O., plans to double the speed of its five-year sewer program. A $2,000,000 program for 1950 was okd after some of the worst flooding in years.

Honolulu, T. H., is in the midst of a 10-year program estimated to cost $23,000,000. Work planned for this year will cost $3,000,000.

Montana road commission names three to vacancies

Vacancies at the top level of Montana's Highway Department have been filled by the reorganized highway commission, which named a veteran Montana engineer to one of the major openings.

Dow Carmichael was named state highway engineer. He succeeds C. T. Stahl, who resigned last winter (ENR March 9, p. 21). Other appointees by the new commission, which was itself reorganized by Gov. John Bonner recently (ENR April 27, p. 26; May 4, p. 9), are M. Glenner, plans engineer for the department who became acting secretary, and Harry H. Jones, who became commission attorney.



LAST WORD IN PAVING—Above left is the experimental machine developed by J. W. Johnson, a research engineer for the Iowa Highway Commission. A truck mixer is about to discharge concrete into the charging hopper. *To the right*, a close-in view shows the back end of the slip-form paver. The cable at right center raises the form when the machine is moved about the job. Immediately behind and just below it is the power-driven belt which finishes the pavement's top surface. Concrete used in these photos was approximately of 3-in. slump. The machine moved at 8 ft per minute. (Blaw-Knox Photos)

Concrete roads built without forms

Melvin Dean
Assistant Editor

"Like squeezing toothpaste out of a tube."

That's the apt description given a new piece of concrete-laying equipment. Designed for construction of low-cost secondary and tertiary roads, the machine threads out a continuous ribbon of concrete at speeds up to 10 fpm, using no forms or special equipment or materials.

Still in the development stage, here's how it stacks up now: It is not for sale to paving contractors, but is a specialized unit for specific types of work. And, as it is one-man operated, it is expected to reduce the cost of concrete-county roads and city streets to a price comparable to other low-cost types of road and street construction. No allowance is made for handling reinforcing steel. Similarly, no allowance has been made for construction of expansion or contraction joints. However, the developers say it would be possible to place these manually after the slab has been formed or possibly by modifying the present machine.

• **Combines three operations**—Essentially, three operations are combined—those of a spreader, transverse finishing machine and longitudinal float. All hand-finishing operations are eliminated. The machine is composed of two separate units—the forming device which rests on and rides along the subgrade, and the propelling unit which drags the forming assembly along by means of link-chain connection.

The forming unit consists of a hopper for receiving the concrete mix, vibrating units for compacting the concrete, slide forms riding on the subgrade and forming the vertical side of the slab, a sliding form which forms the top of the slab, and a reciprocating belt that moves transversely of the machine to form a smooth top surface. Lateral alignment is maintained by a rod projected forward of the machine, permitting the operator to follow the guide line. The machine can be steered around curves. Subgrade may be built in any manner specified by state, county, or city officials, and requires no special treatment for operation of the paver.

Standard concrete-mixes are used and may be delivered to the paver by transit mixers or be mixed on the job site. And, while it would seem that an extremely stiff mix is required, slabs have been built easily using mixes having 2-, 2½-, and 3-in. slumps. Either standard or air-entrained concrete can be used. Asked why the slab, once formed, holds its shape, those in charge of development would offer no answer other than "it just does." Experimental strips built so far certainly seem to uphold their statement.

• **Little cost data**—On this type of unit not much data is available. On a 0.463-mile 20-ft-wide strip built for the town of Primghar, Iowa (O'Brien county), low bid, using standard equipment and methods, was $15,748. Actual cost of the finished road using the new machine was $7,921. In both cases, specifications were the same, and aggregate was furnished by the county.

Present development of the paver is being undertaken by the Blaw-Knox Co., Blawnox, Pa. Plans call for two models: One with a width range of 10 to 15 ft; the other with a width range of 20 to 25 ft. Widths of other sizes are easily made in multiple strips. In so doing, one set of wheels of the traveling unit rides on the already completed lane. As this unit is entirely separate, no difficulties are encountered because the forming device still rides flat on the subgrade. A small trapezoidal space, left between the two lanes, is later filled in with bitumen.

Blaw-Knox reports that it expects to have the commercial models available early in 1951.

Original development of the machine was by J. W. Johnson, laboratory chief, and other engineers of the Iowa Highway Commission.

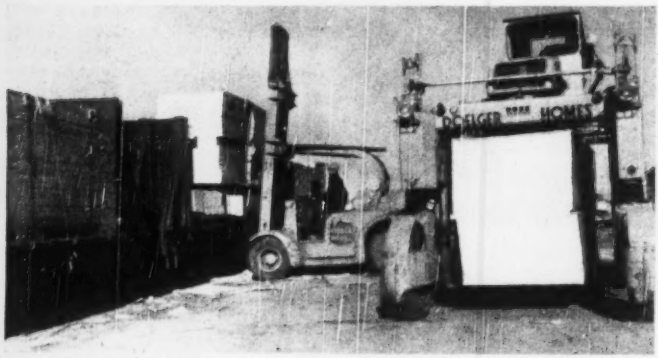
Seek revenue bond law for toll-free highways

Detroit has asked the Michigan legislature to cut a decade from the completion time of two expressways designed to alleviate snarled traffic conditions which are afflicting the city heavily.

Gov. G. M. Williams broadened a special session call to include a measure authorizing the issuance of bonds to be backed by future highway revenues. Proceeds of the bonds would go for completion, within four years, of the Edsel Ford and John C. Lodge expressways. The authorization could cover other similar roads, also. The projected expressways will be free. At present financing rates, they'd take 15 years to finish.

Hills were leveled to provide a site for . .

WESTLAKE HOUSING PROJECT in San Francisco consisting of 7,000 wood houses. The builder, Henry Doelger, spent $450,000 on heavy equipment to move 10,000,000 cu yd of earth. He was able to sell at $11,650 to $23,000 or $8.40 per sq ft, because . . .



SPECIALIZED EQUIPMENT speeded construction. A 3-man crew with two pieces of mechanical lift equipment unloaded 45,000 sq ft of gypsum board from a flatcar and delivered the material to the site one mile away in 11 hr at a cost of 25c per thousand ft, compared with 75c for hand unloading with a 4-man crew and truck and 60c faster. (U.S. Gypsum Co. photos)

Jap cement threat stirs Northwest

Reports that the Defense Department will use Japanese cement in Alaskan military construction have stirred Pacific Northwest manufacturers.

Seattle hears that the department will use 50,000 tons of it in southeast Alaska between Sept. 1, 1950 and June 30, 1951. Bids were to be opened at Anchorage, May 10 on 50,000 bbl more. Conditions on these bids would have assured the Japanese the business. Seattle sources said the opening was postponed following labor and business protests.

John G. Forrest, Seattle representative of the United Cement, Lime and Gypsum Workers, charged Army discrimination in favor of Jap cement. The Anchorage bid call signaled that foreign sources would be exempt from certain conditions such as the 40-hour week, no convict labor and use of American raw materials. Apparently a more persuasive factor in favor of the Jap product, though, is a shipping charge reported to be only $2.50 per ton from Japan to Alaska. It costs $17 per ton from Seattle to Alaska. The lower rate, in Army-chartered ships, is said to be motivated by the need for ballast for ships returning from Japan.

Olympic Portland Cement Co., which shipped 125,000 bbl to Alaska last year, has closed its Bellingham, Wash., plant because of failure to receive such orders this year. And Seattle hears rumors that the Jap plan to ship 125,000 bbl into Portland for sale in U.S.

Waste disposal system eases Niagara Falls load

As its part in preventing overloading of the Niagara Falls city sewer system, the Electro Metallurgical Division of Union Carbide and Carbon Corporation is building a complete wastewater disposal plant of its own. Now partially in operation, the disposal system collects fluids from Electromet's furnaces, concentrators and fume and dust collecting systems.

These fluids pass through a network of underground lines to pumping stations on the plant grounds. Thence they are pumped through an 18-inch, 5,000-ft pipe line to Electromet's refuse property. Here, a thickener separates solids and fluids.

Overflow from the thickener is clear, treated water which is routed through Tuscarora creek, then Cayuga creek to the Niagara river. Underflow from the thickener, consisting of the solids that were entrapped in the water, is pumped to drying beds. Before the clear water reaches Tuscarora creek, it cascades over an aerator—a series of wooden steps. This fall restores the oxygen to the water. Electromet's aerator for aerating ladders is modeled after the aerating ladders used by many fish hatcheries. The thickener and aerator are now processing fluids at the rate of 1,500,000 gallons a day.

Actually, the Electromet's waste water disposal system serves two purposes. It removes the dust and fumes collected in the plant's wet-type dust collecting equipment and pumps the waste fluids to the refuse property, alleviating pollution of the river that might eventually occur if these fluids were placed in the city sewer system.

Service charge endorsed for Los Angeles sewer

Los Angeles City Engineer Lloyd Aldrich has added his endorsement to a recently proposed city sewer service charge to help pay the operating expenses of the new Hyperion sewage treatment plant, expected to go into partial operation in June.

A controversy between the mayor's council and the bond-issue public works over who should be hired as top operating personnel—a team of consulting engineers or local civil service employees—is still undecided.

Aldrich estimated a fee of 50 cents a month on business and home owners and 15 cents for each hotel room would produce a revenue of $3,830,124 annually. He also submitted proposals based on 75 and 100 cents and $1 and 22 cents, with the corresponding estimated returns. Collection costs would be an estimated $275,000 a year, he said.

Water Resources Policy Commission schedules field hearings next month

Public and local government agencies to be solicited for local problems, advice—Five hearings scheduled for June, more in July

Regional conferences during the next two months are going to give local water users a chance to present their ideas to the President's Water Resources Policy Commission. Five area meetings from Arkansas to the Pacific Coast already have been scheduled for June. Two others—in New England and the Southeast—will be held during July.

Decision to hold local conferences was reached by the seven-man commission at its recent meeting at Washington. The commissioners want to give citizen groups an opportunity to express their views at hearings "back home."

Definite dates have been fixed for five June conferences, with meeting rooms and hours to be announced later. These conferences are:

Sioux City, Iowa, June 12-13; Spokane, June 16-17; San Francisco, June 23-24; Denver, June 27-28; Fayetteville, Ark., June 30-July 1.

New England and the Southeast will have their chance to be heard in July. Dates have not yet been set, but the meetings will be held in Springfield, Mass., and Atlanta, Ga.

• **Seek suggestions**—Commenting on the purpose of the regional meetings, commission chairman Morris L. Cooke said the area conferences will be informal, with a view to developing from representatives of state and local government agencies and citizen groups constructive suggestions on which sound national water policy can be based.

"These discussions will deal with such questions as: To what extent should federal government participate in major water resources programs and what should be the character of such participation? To what extent should industries' growing concern for adequate water supply be considered in formulating national policy? How can erosion be reduced? How can we get cleaner water in our streams? How can we assure adequate municipal water supplies? To what extent does water supply become a factor in the event industrial dispersal becomes necessary in connection with national defense?

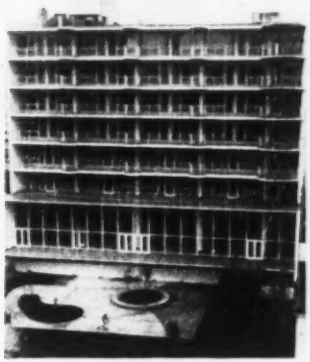
"These and many other related important water requirements problems will be open for discussion in the area conferences, and thus afford the commission an opportunity to discuss these themes basic to our assignment at the centers where they arise."

On the water board's method of operation, the chairman said this:

"The commission has made every effort in its work to date to stress cooperation between federal, state and private groups, thus saving time and expense, as well as getting a better overall picture as the basis for a sound report to be given to President Truman on or before Dec. 1."

• **Government experts involved**—"The commission's organization is composed largely of experts detailed by the government departments most at interest—Agriculture, Army Engineers, Commerce, Federal Power Commission, Interior and Public Health Service. The work of these government employees is supplemented by specialists on water recruited from universities and state governments. Our organization is now functioning at top speed."

Cooke also stressed the assistance of colleges, technical groups and citizens' associations in supplementing staff work at headquarters. Answers to the 18-point economic questionnaire already are coming in from the nearly 150 education institutions and organizations to which the inquiry was submitted at the end of March, with full replies requested by May 31. (ENR Apr. 6, p. 25)



EUROPEAN DESIGN—Maimonides hospital, just completed in San Francisco, was designed by Eric Mendelsohn, European architect now living in San Francisco. The 8-story, reinforced concrete structure, 100x60 ft and containing 83 beds, was built by Barrett & Hilp, San Francisco contractors. Isadore Thompson was consulting structural engineer.

REPRINTS AVAILABLE

Reprints of the article "What Engineers Can Do to Control and Cut Down the Cost of Rats," published in ENR for Apr. 6, 1950, may be had from the Editor, ENGINEERING NEWS-RECORD, 330 W. 42nd Street, New York City, 18, for 25 cents each.

New CAA airport plan lists big work volume

Three-year program would generate construction estimated at almost $1 billion at 5,093 locations

In its 1950 National Airport Plan issued this week, the Civil Aeronautics Administration lists 5,093 locations at which airports should be constructed or improved to meet demands for air service over the next three years.

Fourth in the series of such plans prepared by CAA as required under the Federal Airport Act of 1946, the report presents a three-year forecast of construction projects on public airports considered necessary for civil aviation traffic.

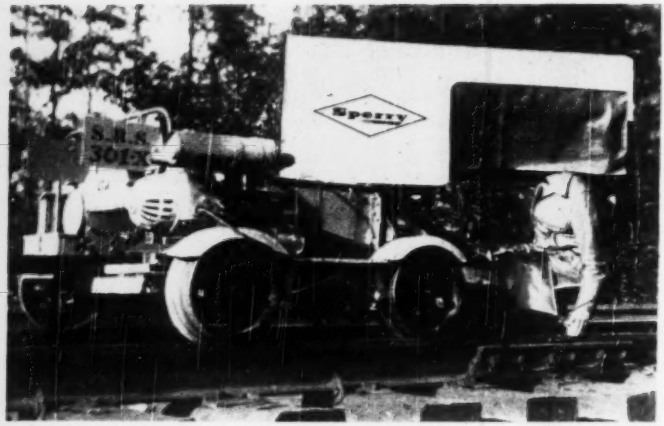
No funds, either federal or local, are assured by inclusion of a location in the plan. But, dependent on appropriations by Congress, CAA will put in its program for fiscal 1951 those locations that show the greatest need, according to the latest national plan just released.

• **Nearly $1 billion**—For its own guidance, CAA has estimated the cost of the work outlined in the plan at $928 million. Broken down, that would mean $446 million in federal and $482 million in local sponsor funds.

Among the 5,093 locations listed in the 1950 plan, 4,964 are within the continental limits and 129 are in the territories. Of the projects, 2,316 are for improvement of existing airports, and 2,777 are for entirely new fields.

The plan lists 575 Class IV and larger airports, of which 25 are new and 550 for improvement. For the next size airports, Class III, the report names 597, 143 of them new and 454 to be improved. Most of the projects are for the smaller Class II and Class I airports, more than 3,500 in all, nearly 2,300 of them new. In addition, 512 seaplane bases and 66 heliports are listed in the plan.

Grouped by states, the plan shows for each project the present and proposed class of airport, type of scheduled air service, and status under the federal airport act. A summary for each state breaks the complete plan down by airport class, new airports, those recommended for improvement, and estimated cost in federal and sponsor funds.



NEW RAIL INSPECTION DEVICE—A new type of ultrasonic testing device is being used on railroads of this country, primarily to discover cracks or breaks in rail joints in place. It supplements the detector car that has been in use for several years to locate transverse fissures in rails. Only one man is required to operate this new device. He sits on a swinging seat at the rear of the trackmotor car on which it is installed, which permits him to test joints in both rails. He runs a small searching unit along the rail head at each joint which sends vibrations at very high frequency into the rail. These vibrations are reflected on a small screen under the hood over the operator's head. The screen shows any break in the beam of vibrations, whether caused by cracks or by the bolt holes themselves. However, the bolt holes establish a definite pattern so that the operator can recognize quickly any irregularity caused by a crack. The irregularities also show the exact location of the crack and its extent. The device was developed by Sperry Products, Inc., and is leased to railroads by the Sperry Rail Service, of Danbury, Conn.

Coulee storage available for floods this spring

Under an agreement reached by three federal agencies, use of flood control storage at Grand Coulee is expected to reduce materially flood damage in the Columbia River area during the spring runoff season.

Parties to the agreement are the Bureau of Reclamation, Corps of Engineers, and Bonneville Power Administration. The three groups decided that use of a maximum of 900,000 acre ft of storage would reduce the flood crest at Vancouver, Wash., by 1.2 ft. Use of more than that amount of storage would adversely affect logging, sawmill and other activities in the area.

The late spring and slow thaw of the heaviest snow in years in the Canadian Rockies have brought forecasts of flood conditions almost as serious as in 1948, when the Columbia reached its highest stage in 50 years. These forecasts brought about the decision to use Grand Coulee storage to reduce the menace. Grand Coulee was not constructed for flood control only, but for power and irrigation, but representatives of the government agencies agreed it should be used as much as possible for storage without interfering with its normal functions or with private business operations.

A day by day control will be exercised during the flood period, in late May and early June. The Bureau of Reclamation will adjust discharge at Grand Coulee in accordance with daily requests of the Corps of Engineers, based on water and weather forecasts by the United States Weather Bureau.

Anti-speculation law upheld in Columbia Basin

In a decision regarded as of utmost importance to successful settlement of the Reclamation Bureau's Columbia Basin Project, Superior Judge Lee W. Whitfield, at Ellensburg, Wash., held applicable and valid the anti-speculation provisions of the Columbia Basin Project Act.

The decision came in a case brought by C. W. Hall against Franklin County Irrigation District No. 1. It sold Hall land within the project for $1,605 in excess of the appraised value fixed in accordance with the Act, and the terms of the recordable contract between the district and the United States. These provide that lands covered by the contract cannot be sold for more than the appraised value.

In holding for Hall, Judge Whitfield commented that "experience has shown that the only irrigation districts in the state and the owners of lands made susceptible to irrigation by the various projects and other companies had suffered from speculation by early settlers. It became notorious that at took three mortgage foreclosures before an irrigated tract of land was settled upon permanently. This provision in the Reclamation contract was intended to and has, largely eliminated the hazards of early settlers on newly irrigated lands."

This is the first court case testing these provisions of the Act.

North Carolina road dispute goes on

North Carolina road builders and the state highway commission continue to clash over the state's tremendous construction program. (See p. 136.)

Executive secretaries of the Carolinas Branch, Associated General Contractors, and the Carolina Road Builders Association issued a joint statement criticizing the commission's force account construction program and asking more work for contractors.

Shortly before this statement, spokesmen for the commission wondered out loud whether North Carolina contractors didn't have about as much road work as they could handle. They noted that there had been a distinct slump in the number of contractors submitting bids at April lettings. Chief Engineer W. H. Rogers, Jr., said "this might be due to more optimism on the part of contractors or it may be that most firms are loaded with work." At the next subsequent bid opening, though, Rogers "noticed some increase in competitive bidding."

The associations' joint statement said flatly that:

"There are several million dollars worth of equipment standing idle due to an insufficient amount of work being let to contract."

It added that contractors who ordinarily would confine their operations to the state have had to go beyond its limits for work.

Meanwhile, the state Supreme Court upheld the commission's purchase of road building equipment with bond funds, dismissing a suit brought by Contractor Nello Teer. With the ruling, Rogers announced that the state does not contemplate large scale additional purchases of equipment for the rural roads program. Most state work will be on small, scattered jobs, commission sources indicated.

Buses and foundries fight smog in L. A.

Foundries face end of permits this month without accepted substitute—Test propane-fueled vehicles

Los Angeles' vigorous smog control program was in the news this week on several fronts with these developments:

1. A transit company tested propane-fueled buses as a means of cutting down exhaust fumes and solid discharges.

2. Dar-Howell Manning, Inc., became the first gray iron foundry to submit a plan for elimination of emissions of air pollutants.

3. The Elyr Co. announced it would suspend operations at its $1,500,000 plant, partially because of labor troubles, partially because it found smog control rules unworkable.

The smog control board, while not unhappy about the propane bus proposal, indicated that it considered automobiles much worse as air polluters. It figures the maximum daily contribution by trucks and buses, on a test for SO$_2$ emission, as five tons. Automobiles contribute a maximum of 25 tons, the board found. Senior Inspector W. H. Parmelee, of the Los Angeles County Air Pollution Control District, conceded that propane fueled equipment could well be the answer to the problem of irritating motor exhaust in highly congested areas. And a district spokesman added:

"Certainly, if we could avoid reports on orange tree blight from exhausts on highways and rid downtown streets of fumes, our program would be that much more successful."

• **Substitute electric furnace**—Dar-Howell Manning has submitted plans for installation of a direct arc, two ton capacity electric furnace to replace an existing cupola. It expects authorization to install it, but such authorization does not guarantee a permit to operate. Meanwhile, it has asked for an extension, until the furnace is ready to operate next month, of a year-old permit to operate existing facilities. More than 40 other gray iron foundries face expiration of similar extensions May 22. A joint committee representing these foundries has been seeking answers to gas cleaning problems. Under consideration are water washers, glass and wool bags, steam cleaners, centrifugal cleaners and electrical precipitators. Reports will be made at a hearing May 22 on the costs and efficiency of each.

Members of the committee have said compliance with the terms of the smog control act is impossible, and base this feeling on the definition of the permissible discharge in relation to tons of iron poured.

Officials of the Elyr Co., which faced costs of almost $50,000 to control precipitation at 85 percent of the requirement, said that 85 percent efficiency is possible, but that complete compliance isn't with any equipment now designed or offered.

Elyr complained the smog control officials were of no assistance, and would go no further than to approve plans for abatement equipment.

Studds succeeds Colbert as chief of USCGS

President Truman has nominated Capt. Robert F. A. Studds, veteran of World War I, to be director of the U. S. Coast and Geodetic Survey. Captain Studds, who has served with the CGS for 31 years, will take the rank of rear admiral on confirmation. He succeeds Rear Admiral Lee Otis Colbert, who retired April 7 after 42 years.

Studds received a B. S. in Civil Engineering from Catholic University in 1917. During World War I, he served with the 472nd Engineers, after service with the District of Columbia government in an engineering capacity. Joining the Coast and Geodetic Survey thereafter, Captain Studds commanded half a dozen ships for the bureau. He has aided in the survey of waters in the Atlantic Ocean, Gulf Stream, Pacific Coast, West Indies, Alaska and in the Philippine Islands.

His latest command was the Pathfinder, one of the survey's newest vessels, which he took into eastern Mexican waters. At present, he is chief of the Division of Charts, Washington, D. C. In 1936, he commanded the Pathfinder, which was tossed on a coral reef by a typhoon.

Tried an A-bomb yet?

C. G. Byson, head of the C. G. Byson Building Material Co., Glendale, Calif., and a veteran building demolisher, said his company had almost met its match when it undertook to raze the Ethyl Building, Los Angeles, to make way for a freeway.

"Talk about earthquake proof," Byson moaned, "this baby is almost raze proof."

He said the two-story reinforced concrete building, built by the Ethyl Corp. in 1938, took the battleship blows of a 3,000 lb steel ball with stolid resistance.

Byson said demolition work was going to be harder and harder as the years go by, because of the added strength built into present day buildings.

"We may have to develop some sort of explosion technique," Byson predicted.

New contract forms in use by government

Provisions to help small business, balk "five-percenters" are included — Two types replace many

New contract forms for all supply and equipment purchases by federal agencies have gone into use officially.

Use of the new forms does not become mandatory until Oct. 1, to allow time for adjustment by any agency that might have special difficulties in making the changeover. For all practical purposes, however, the General Services Administration expects the forms to be in use by almost all Government agencies by May 8.

GSA and the Department of Defense worked together in developing the forms to make them uniformly applicable to both civilian and military agencies.

• **Small business protected**—As a yardstick for measuring the size of each firm that bids for a contract, the revised forms include a question on the firm's total number of employees. This question, GSA Administrator Larson says, is to help government agencies carry out the policy enunciated by Congress and the President that small business get its fair share of contracts.

Under the new dispensation, contract forms of two types replace the former plethora of government paper for supply and equipment purchases. As a further simplification, a consolidated single set of general conditions—applicable to either of the two types of contracts—takes the place of all previous separate provisions.

These general provisions accompanying the bid forms spell out twenty terms of agreement. They include the provisions required by Congressional actions, such as adherence to various labor laws, as well as bond security clauses, assignment of claims and others.

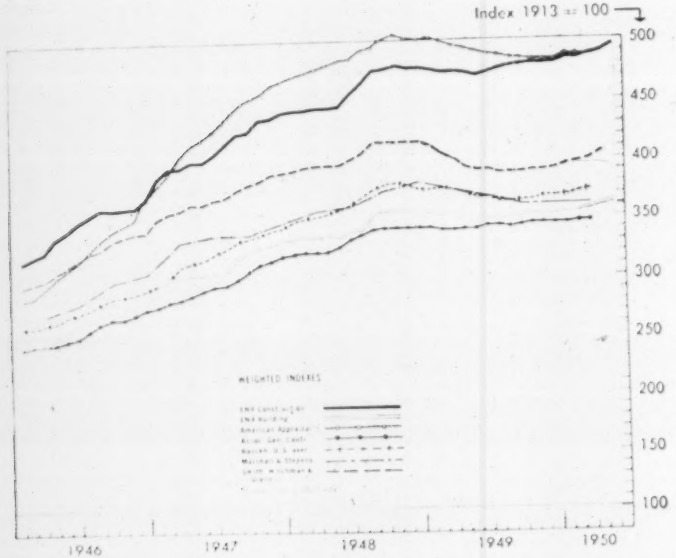
Provisions specifically relating to taxes, to inspection and to defaults have been expanded in considerable detail. The hope is to minimize the possibility of misunderstanding.

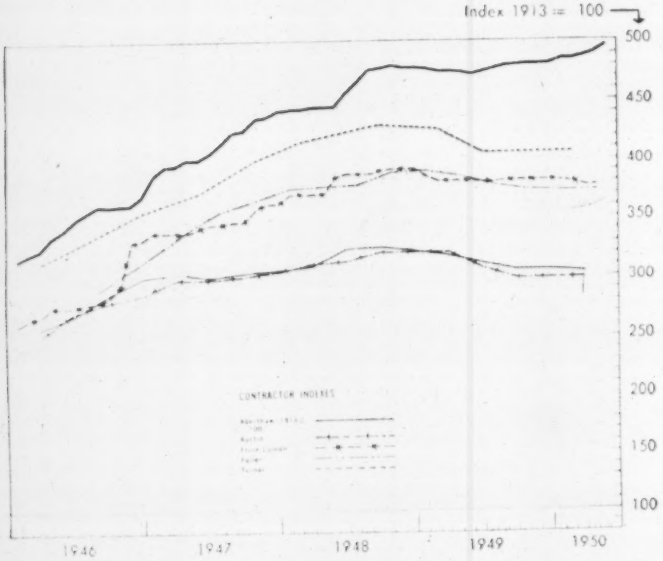
With a further eye to the "five-percenters," the revised forms include another new requirement.

Where more than $25,000 is involved in an advertised contract or more than $1,000 in a negotiated contract, the bidder must declare whether or not he has retained a special representative, other than a full-time employee, to help solicit the contract.

Larson said that the statements about the employment of special representatives and the payment of contingent fees would protect the government, business, and legitimate manufacturers' representatives.

CONSTRUCTION BUSINESS





Construction costs up, prices steady

A roundup of construction cost and price indexes for the 1950 quarter shows costs rising while prices hold steady. The ENR Construction Cost index is up 3.8% since December and it's still climbing.

The index for May 1 is 573.5 (1913 = 100), up 0.6% from April 1. It is now 5.4% above the 1948 high and 4.2% higher than the 1949 low.

The Building Cost Index is now 364.2%, 0.4% above April. It tops the 1948 high by 2.0% and the 1949 low by 4.4%.

Wage hikes account for most of the steady gain in costs since the first of the year. Some lumber prices also contribute.

• **All show cost rise**—Every weighted index of construction cost tells the same tale. The Smith, Hinchman & Grylls index shows the biggest 1950 rise—up 3.8% from December to April. Other indexes, available only through March, show fractional gains for the first quarter. The E. H. Boeckh indexes of building cost are up fractionally for March. The national average for all types of commercial and factory building is up 0.4% to 573.5 for March (1913 = 100); this is 1.4% above December, 1949.

• **Contractor prices down**—While wage and material costs are rising, contractor price/cost indexes have declined or held steady this year.

Frank Colmon's April index was the same as March at 357, but it was 1.5% below last December. The Aberthaw index for March was 304.6, almost 1% lower than December.

Other contractor indexes were steady during the first quarter.

Weighted indexes	Dec. 1949	Latest report 1950	% chg
ENR Construction	480	May 497	+3.5
ENR Building	353	May 364	+3.1
American Appraisal*	482	Mar 486	+0.8
Associated Cons't	343	Mar 346	+0.9
E. H. Boeckh	468	Mar 475	+1.5
Smith, Hinch. & Gry.*	476	April 497	+4.4
Marshall & Stevens	561	Mar 562	+0.2

*Corrects for productivity

Contractors' indexes:			
Aberthaw	307	Mar 305	−0.7
Frank Coffman	357	Apr 357	0
G. A. Fuller	4627	Feb 4627	0
Turner	4627	Feb 4627	0
Frank Colmon	382	Apr 377	−1.3
Austin	298	Mar 298	0

(January, 1936 = 100; November, 1949 = 100)

Contractor failures

For the past year, news of rising costs and dropping bid prices has kept the warning flag flying for construction contractors.

That the danger is real is evident from the Dun & Bradstreet report that 538 contractors failed in 1949, highest mortality in 15 years on record. Building contractors account for 52% of these failures; other general contractors for 40. Subcontractors headed the casualty list last year with 47% failures to 50%.

Construction Business Failures
Dun & Bradstreet reports

Type of contractor	No. of failures January–March 1948	1949	1950
Total	88	193	124

	Years 1948	1949
Total	638	538

In the first quarter of 1950, general contractor failures are down a little. But subcontractor mortality is up to 142, as compared with 101 last year and 50 the year before.

BIDS AND BIDDERS

(Major project news received after Construction Reports, page 89, went to press.)

Plant—McGraw Construction Co., Middletown, O., has been awarded contract to build plant at Syracuse, N. Y., for Solvay Process Division, Allied Chemical Co. The total estimated cost with equipment is $20,000,000.

Veterans Hospital—Veterans Administration, Washington, D. C., will open bids July 18 for the construction of hospital at Oklahoma City. The project, to cost $12,000,000, will adjoin the University of Oklahoma School of Medicine.

Stilling Basin and Power House—U. S. Engineers, Bismarck, N. D., received lowest bid for constructing stilling basin and power house foundation for Garrison Dam and Reservoir, in North Dakota, from United Construction Co., Winona, Minn., at $9,740,245.

Veterans Hospital—Corbett Thompkins-Wunderlich, Washington, D. C., will construct $11,634,626 hospital at Salisbury, N. C., for the Veterans Administration, Washington, D. C.

City Prison and Remand Center—Department Public Works, City of New York, will take bids June 14 for city prison and remand center at proposed Civic Center, Brooklyn Boro. Alfred Hopkins Associates, New York, designed structures which will cost about $6,000,000.

Office—Angus Robertson, Ltd., Montreal, Que., has been awarded contract for East Block Office Building at Ottawa, Ont., for Department of Public Works, Dominion Government, Ottawa, Ont., at $5,170,000. Allward & Gouinlock, Toronto, are architects.

Memorial Coliseum—Franklin County War Veterans Memorial Building Committee, Columbus, O., plans memorial coliseum at Columbus to cost about $4,500,000. Allied Architects Associated, Columbus, is architect.

Dwellings—Reed & Yancey Construction Co., Houston, plans building dwellings at Houston to cost about $3,950,000. W. H. Yancey, Houston, is architect.

Underground Telephone Conduits—Southwestern Bell Telephone Co., Houston, plans underground telephone conduits in Houston, Jacinto City, Greens Bayou and Channelview at about $3,000,000.

Apartment—Northgate Co., Seattle, Wash., awarded contract for apartment in Seattle, to Howard S. Wright Co., Seattle, at about $2,000,000. John Graham & Co., Seattle, is architect.

Highway—Williams Construction Co., Middle River, Md., was low bidder at $1,448,980 for improving road in Howard County when the Maryland State Highway Commission, Baltimore, received bids April 25.

School—Whittier Union High School District, Whittier, Calif., approved $2,500,000 bonds for constructing schools. William H. Harrison, Los Angeles, is architect.

Hotel—J. A. Jones Construction Co., Charlotte, N. C., was low bidder at $2,060,000 for constructing Jung Hotel additions in New Orleans. Weiss & Silverstein, New Orleans, are architects.

Lumber Mill—Long-Bell Lumber Co., Longview, Wash., plans rebuilding mill destroyed by fire, at Vaught, Ore. Estimated cost is $2,500,000.

Filtration Plant—City of Allentown, Pa., received low bid for constructing Contracts 1 and 2 on city filtration plant from Progressive Builders, Inc., Camden, N. J., at $1,871,660. Morris Knowles, Pittsburgh, Pa., is engineer.

Dwellings—Chogolate Bayou Estates, Houston, plans dwellings in Houston to cost $3,200,000. Kingsman & Webster, Houston, are architects for the project.

Cotahille Reservoir—Texas Construction Co., Dallas, has been awarded $1,055,588 contract to construct Stage 2, Cotahille Reservoir, Iowa River, Johnson County, Iowa, by U. S. Engineers, Rock Island, Ill.

Housing—Allied Construction Co., Idaho Falls, Idaho, plans constructing housing at Idaho Falls and similar project at Blackfoot. Each project will cost $2,000,000.

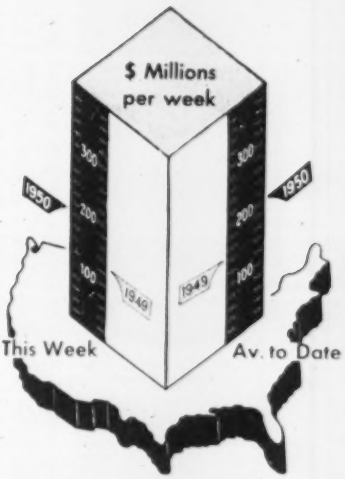
Sewage Treatment Plant—City of Rochester, Minn., will vote May 16 on $2,500,000 bonds for sewage treatment plant and additional sewers. Foltz, Kink & Day, St. Paul, are consulting engineers.

High School—Board of Education, Dayton, O., plans constructing vocational high school. Estimated cost is $2,000,000.

COSTS AND VOLUME

ENR INDEX NUMBERS

Index Base	100	1944	1926
Construction Cost	May '50	398.53	238.6
Building Cost	May '50	364.27	196.9
Volume	Apr. '50	287	170



Activity This Week

As reported to ENR (in millions of dollars)

Amount of contracts let

	Week of May 11 1950	Cumulative 1950 (19 wks.)	Cumulative 1949 (19 wks.)	% chge
Federal	$56.0	$356.0	$352.5	+1
State & Muni.	61.6	423.6	397.2	+7
Total Public	$117.6	$779.6	$749.7	+4
Total Private	98.2	724.5	1,089.9	−33
U. S. Total	$215.8	$1,504.1	$1,839.6	−18

Contracts by type of work

	This Week	Cumulative 1950 (19 wks.)	Cumulative 1949 (19 wks.)	% chge
Waterworks	12.4	135.6	95.6	+42
Sewerage	7.6	85.6	85.1	0
Bridges	3.6	112.2	114.7	−2
Highways	22.4	292.1	240.4	+22
Earthwork				
Waterways	7.8	142.6	225.1	−37
Industrial				
Public	12.1	212.3	268.6	−21
Industrial	12.1	288.1	261.5	+10
Commercial	26.4	1,041.7	871.1	+20
Unclassified	11.5	326.1	265.0	+23

[NOTE: Minimum size projects included are: Waterworks and waterways projects, $25,000; other public works, $50,000; industrial buildings, $68,000; other buildings, $250,000.]

New capital for construction

	1950 (19 wks.)	Cumulative 1949 (19 wks.)	% chge
Corporate Securities	$626,182	$1,013,950	−27
State & Muni. Excl. Housing	243,580	229,693	+2
Housing	227,619	299,820	−25
Total Capital	$1,097,181	$1,543,463	−51

More miles of concrete pavement will be constructed this year as . . .

Ohio Gets Set For its Biggest Road Program

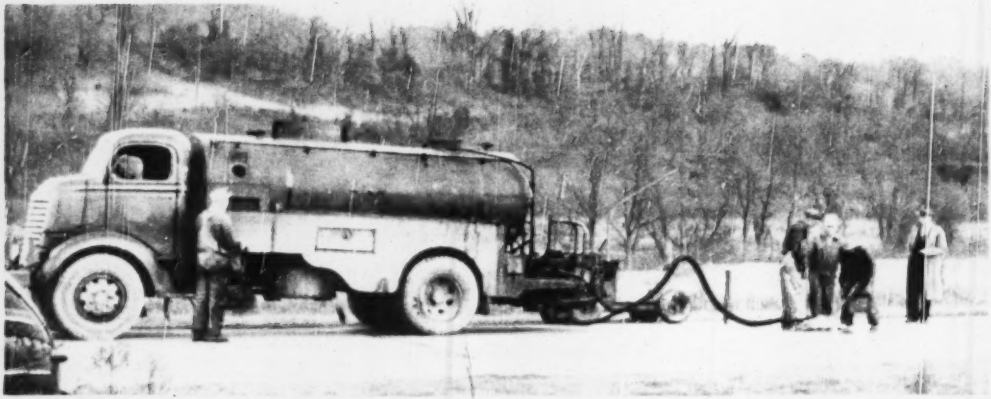
Ohio won't win its battle with the rapidly developing "obsolescent" highway this year or next, and perhaps not for many years to come. But the many innovations put into effect by the state highway department during the past several months have made possible an expanded, fast-moving roadbuilding program in 1950, with chief emphasis on increasing the tempo of construction as well as reducing costs.

Not only is the department getting set for the biggest construction program in its history, this season, but it is laying the groundwork for sustaining programs of equal or even greater magnitude.

High points of the department's developments in organization, planning and programming, location and design, and the training of an adequate technical staff are presented in the following. Activities of the other bureaus of the department to speed the work and reduce costs of construction and maintenance will be published in subsequent issues of ENR.

Two noteworthy trends, already apparent, are: (1) highway construction costs are coming down, and (2) the tempo of the work is being sharply increased. Contract prices are averaging from 10-30% under those of a year ago, while this year's dollar volume of construction is expected to be 2½ times last year's. This healthy condition of decreasing costs and increasing construction productivity is a combination of several factors, with competition among contractors rated as the greatest single factor.

The state highway department, reorganized early last year, has been



MANY MILES of old rough pavement will be leveled up this year either by subsealing with a heavy liquid asphalt, as shown, or by "mud jacking" with a cement slurry.

built up to greater efficiency. It has a substantial backlog of prepared plans, enough money and engineering manpower to handle this year's construction program—estimated to reach $70,000,000—and there promises to be enough contractors to handle the work.

Sparkplugging this organization of 7,700 persons is Ted J. Kauer who recently ended his first year as director of the department. During that period he introduced several innovations aimed at increasing the productivity of his several bureaus, thereby reducing the cost of preparing design plans, making field surveys and supervising construction. Contractor-engineer relations have been improved substantially, and more workable measures have been adopted for improving field supervision without hampering construction progress.

• **New bureau established**—For one thing, Kauer established a new bureau—the Bureau of Planning and Programming. This new bureau takes a great load off the overburdened Bureau of Location and Design, enabling it to function more efficiently.

Other cost-cutting and time-saving measures introduced by Kauer include: The adoption of concealed engineers' estimates on state projects (Federal-aid projects already called concealed bids); a highway training program to develop young engineers in the department; reclassification of engineers into ten grades for more equitable compensation for work performed; streamlining the processes of right-of-way acquisition and plan preparation to implement urgently needed highway improvements; and reduction of the required amount of city participation in the costs of freeway and urban highway construction costs.

Mr. Kauer also has engaged consulting engineering firms to help get the department over the "hump" in its 1949-1950 construction programs; accepted the position of secretary and treasurer of the Ohio Turnpike Commission; set up a 16-state study of truck weights and sizes; and expedited the long-range study of Ohio's highway needs.

• **Planning and programming**—Chief responsibilities of the newly-created Bureau of Planning and Programming are—as its name implies—advance planning and programming of all highway improvements. Headed by Norman M. Wilke, chief engineer, and C. H. Mikesell, assistant chief engineer, plus a staff of 14, this bureau functions well in advance of location, right-of-way acquisition and plan preparation. For example, it recently finished setting up the 1951 highway improvement program and is starting on the 1952 program.

The Planning Survey Section of the highway department with its 125 personnel was transferred to the Bureau of Planning and Programming, as was the railroad crossing engineer.

Starting with the budget for a year's construction program—based either on funds available or estimated—a tentative construction program is set up, including construction priorities for the various projects.

This is followed by securing the adoption of all necessary "consent legislation" needed for certain urban construction projects. In some instances this is covered by joint participating agreements with municipalities and counties cooperating in the improvements.

When the current long-range study of Ohio highway needs is completed this fall, it will be turned over to the Bureau of Planning and Programming for further refinement. The ultimate aim is to secure a "deficiency" or "sufficiency" rating on all rural and urban projects on the state system. Priorities of reconstruction then can be established for the various sections of highways based on these ratings, with proper adjustments made from time to time.

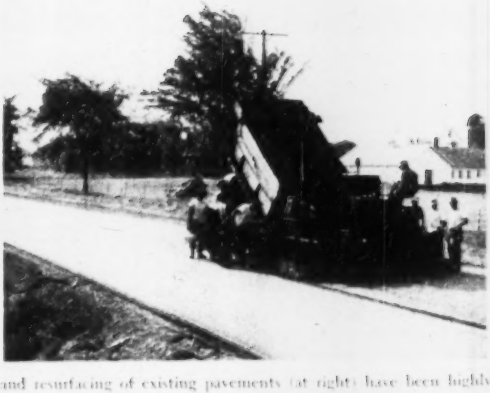
The long-range study of Ohio's highway needs is headed by J. P. Buckley, of the Automotive Safety Foundation, as consultant to the state highway department. C. F. McCormack is supervising engineer.

• **Highway training program**—Recruiting of young engineers is of vital importance to the state highway department. Although only one year old, this program has already shown great promise.

There are 135 engineers now in training in the department, compared with about 25 this time last year. This number will be increased from time to time since there is a definite trend of engineers returning from private practice to highway work. Also, from 30 to 40 young engineers must be recruited each year to take care of normal replacement.

The highway training program works like this: Those enrolled in it must be graduate civil engineers, and they must have applied for registration as a Professional Engineer in Ohio.

The training program runs three years. Starting salary is $270 per month, and is increased to $345 per month upon receipt of a professional license. The trainee's time is divided between the central and division



WIDENING of structurally sound but narrow pavements (at left) and resurfacing of existing pavements (at right) have been highly mechanized, to speed the work and reduce its cost.

offices; also between office and field work.

During his 3-yr training the trainee spends 6 months on bridges, 7½ months on construction, 10½ months on location and design, and 3 months each on maintenance, planning and programming, traffic and safety, and testing. By the end of this program the trainee has more than a working knowledge of the various departmental activities, and is ready to be assigned permanently to the phase of engineering he is best suited for.

• **Location and design**—The Bureau of Location and Design is being geared to turn out enough field surveys, plans and specifications to constitute a $60,000,000 highway improvement program for 1950. This program, covering federal-aid primary, secondary and urban highways, and state-aid roads plus about $10,000,000 worth of new bridges, will total $70,000,000, the largest in the department's history.

Farsighted engineers in the department do not, however, view this as an unusual accomplishment; they anticipate continued yearly construction programs of this magnitude, or even larger.

Field surveys, design plans and specifications for highway construction are prepared in the state's 12 division offices. Bridge plans are prepared in the central bridge office at Columbus.

Several measures have been taken to streamline and speed up the production of road and bridge plans to insure the $70,000,000 road and bridge construction program being awarded for 1950. All division offices have been instructed to report only three projects on which plans definitely will be ready to advertise for letting by Sept. 1. This will permit the execution of construction contracts for all such projects by the first of next year.

To make the program even more definite, delivery dates have been established for sending completed road plans to the central office for overall review and advertising for letting. Delivery dates also have been established for completed bridge plans. By coordinating the delivery dates of road plans and bridge plans, the department can set up an orderly sequence of contract lettings for the various projects.

• **Traveling engineers**—The central office renders all possible aid to the division offices in preparing road plans. It has four traveling engineers who assist the division engineers in making on-the-spot approval of road design questions. If some highly technical issue is involved, a trained technician is sent out from the central office.

Right-of-way acquisition also has been streamlined and speeded so as to not hold up the awarding of contracts. Division offices secure all right-of-way. They are aided in this work by a 15-man "floating crew" of negotiators especially skilled in securing right-of-way. In infrequent instances, however, all negotiations are unsuccessful, and the right-of-way must be secured through the courts, by Right of Eminent Domain.

• **Aerial surveys**—Another time-saving and cost-reducing innovation is that of aerial surveys by state crews operating a state-owned aeroplane. Contours at 1-ft intervals prepared from these "photogrametric" surveys are sufficiently accurate for bridge-site surveys. In fact, 50 site plans for proposed bridges were made by this method last year, saving an estimated 3,000 man-days of bridge surveying time.

Photogrametric surveying has been even more profitable in following and cost reduction on secondary road improvements involving relatively little physical change in alignment or profile. State law requires a plan and profile for all such work.

Aerial surveys enabled the division offices of the Bureau of Location and Design to prepare plans and profiles last year for more than 100 mi of secondary road improvements. This resulted in an inestimable saving in time and money over the conventional method of surveying by ground crews.

• **No compromise on quality**—In simplifying its construction requirements, however, the highway department has made no compromise on quality. In fact, portland cement concrete pavement has been increased to 9 in. in thickness, and the amount of reinforcement has been increased from 56 lb to 85 lb per 100 sq ft. Granular subbase also is required under all concrete pavement. Expansion joints have been eliminated in concrete pavement except at bridge ends, and the contraction joint spacing has been increased from 40 ft to 100 ft.

Another policy change adopted by the department in its standard specifications is that of permitting a 24-ft width of concrete pavement to be placed in one strip. Heretofore, the specifications required it to placed in two 12-ft widths, doweled at the centerline.

Whether or not this will effect a reduction in construction costs is a moot question. Which six of the state's biggest concrete paving contractors were advised of this when proposed, 24-ft permissable paving width, three said they would pave 24-ft width, but the other three said they would stick to paving two 12-ft lanes.

The $70,000,000 road improvement program planned for this year (all to be by contract) is only 10% greater than the 1948 program ($59,000,000), but it is 140% greater than last year's program ($27,000,000).

• **Poor showing last year**—The truth of why last year's roadbuilding program was so disappointingly small is this: On January 1, 1949 the political administration of the state changed. The previous administration had awarded contracts for all projects on which plans had been prepared. With no backlog of prepared plans, the new administration had to start from scratch. And it was late spring when the new and reorganized department settled down to preparing plans and awarding contracts in earnest.

In spite of the political upheaval, the department awarded $27,000,000 worth of road improvements last year. It included 305 mi of asphaltic concrete, 38 mi of portland cement concrete (mostly reinforced), 30 mi of plant-mix and road-mix bituminous pavement, 86 mi of bituminous surface treatment and soil stabilization, 30 mi of soil-cement stabilization, and 8 mi of miscellaneous construction, a total of 507 mi of road improvements.

Karl J. Rothermund is chief engineer of the Bureau of Location and Design, which employs 420 in the 12 division offices and 115 in the central office. Ralph E. Eckman is assistant chief of the bureau.

British Have Water Trouble

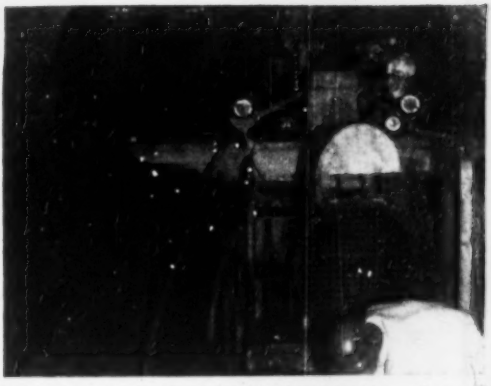
New York's current troubles with water shortage (ENR Jan. 12, p. 27) are closely paralleled by the worries of British cities. Britain also had an unusually dry summer in 1949.

One of the more interesting solutions to the problem of conservation was that of the Tynemouth Corp.

After some experimentation, the corporation's engineers decided that any drastic move such as complete shutting off of water for stated periods would achieve too little in the way of saving since householders simply filled vessels before the shut-off occurred.

Final solution was to send inspectors to each house in the community to close off main valves to permit only a specified amount of water to flow from the taps. By this means (which did not include a restriction on industry excepting voluntarily) a saving of nearly 50 percent of domestic supplies was achieved.

AIR-OPERATED BOOMS, in first tunneling use, help Frazier-Davis men position five drifters quickly, on . . .



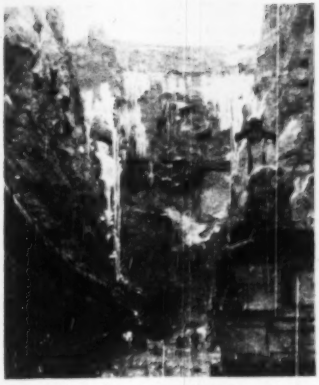
JUMBO for driving Neversink Tunnel rock heading. Blower on jumbo's rear draws dust, vapor away from face.

Up-to-Date Tunneling at Neversink

. . . with some old-fashioned hand-mining thrown in

NEW YORK'S BROAD supplementary water from the Delaware River watershed will begin to come in time in 1953 when Neversink Tunnel goes into operation. This five-mile bore will connect Neversink Reservoir, on a Delaware tributary, with Rondout Reservoir, in the Hudson River valley. From Rondout, the water will go 80 miles to New York, through the Delaware Aqueduct (ENR Jan 14 1937, p 41, etc.).

The drawing below shows 25,650 ft of main tunnel and 1,780 ft of discharge conduit tunnel. These will have a finished diameter of 10 ft, except in the lower 1,050 ft of main tunnel, where diameter will be 8 ft. The conduit is holed through, and work is progressing in both main portal headings. With the exception of 372 ft in earth, the entire length is in rock.

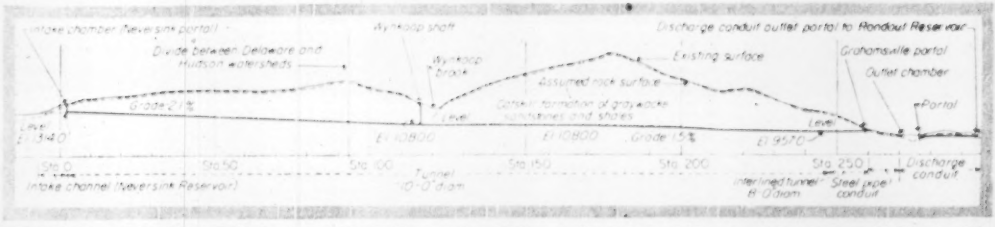


INTAKE PORTAL was opened in December, 1949, after months of excavation for intake chamber, whereas . . .

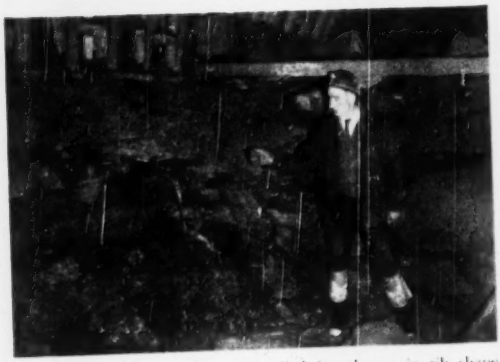
DISCHARGE CONDUIT heading was started in July. Work on this 1,590-ft section slowed in 183 ft of soft ground.

• **Rock tunneling methods.** In trading up for 250 ft at weekly progress per heading, contractors Frazier-Davis of St. Louis had the benefit of two post-war devices: the carbide-insert rock bit and an air-operated boom for handling drifters. The former was just coming into full recognition when the job started; the latter had been used in mines, but was enjoying its first application to construction tunneling.

A rail-mounted two-deck drill carriage carries six of these air booms, three on the top deck forward, two



NEVERSINK TUNNEL (profile looking north) will carry first Delaware River watershed water into Hudson Valley for New York's water supply; will connect Neversink and Rondout reservoirs, part of New York Board of Water Supply's Delaware project.



TRANSITION from rock to earth (left) called for change in rib shape and spacing; air mucker shown. Soft ground heading had rock bottom; man at top drift bench (above) indicates water inflow.

on the bottom deck, and one 4ft for auxiliary drilling (under brick, carpasser and double track excavation, and pin holes). Air motors hoist the booms, which traverse manually. Drifter position at the boom end (swing and elevation) also is obtained manually. Drifters have 3¾-in. bore, 4 ft aluminum shell and feed.

Carbide insert bits of 2-in. and 1¾-in. size, respectively, drill 4-ft increments for a total hole depth of 5 ft on the horizontal. The hole size change is dictated by the latest practice (ENR, Feb. 9, p. 55) to reduce the number of stuck drills. Other accepted carbide insert practices include making one man responsible for all bits, and pulling bits out of the heading once a day for regrinding before they get so dull they are likely to incur excessive insert breakage. Drill bits will continue to cut Dorsey Dixon gets 1,600 ft average drilling out of its bits in the tunnel's predominant rock, a relatively soft red shale (1,400 ft in sandstone).

A firing round includes 40 holes, loaded with 200 lb of explosive. Six rounds are fired in a 24-hr day, each pulling 74 ft, to account for a powder expense of 0.4 lb per cu yd of muck.

Rock is removed by a 75-hp Conway-Decker mucker. (An experienced hand has worked perfect the job.) Here the power for the mucker is brought into the tunnel at 2,300 volts, stepped down to 440 volts by a transformer kept within 1,000 ft of the muck pile.

In the Grahamsville building yard side dump cars dump by batter board motives haul the material outside to hillside hoppers that feed trucks for dumping at a nearby spoil area.

In addition to the hoppers, facilities clustered about the portal include a concrete plant, plus the customary compressor and blower house, change house and shops, as well as a gunite house. At the Neversink portal part of the facilities are at the top of the intake chamber cut, 70 ft above tunnel grade. The blacksmith shop is notable because it appears less fully equipped than those of the steel-lined era. Instead of the automatic grinding machinery formerly encountered, there is merely a small bench grinder —all that is necessary for the carbide inserts.

• **Rock sealing a major operation**—One shop that's not so customary is the gunite house, where dry mortar materials are mixed and sacked for loading on a three-car rock-sealing train. (See picture of train with in-place-ment equipment.) These facilities are on the job because of the type of rock predominating in the tunnel. The red shale weathers quickly on exposure, and if it were not for the air-placed mortar, the engineers soon would have to require steel ground support throughout a substantial part of the tunnel. Instead, they require immediate sealing wherever the rock will weather on exposure.

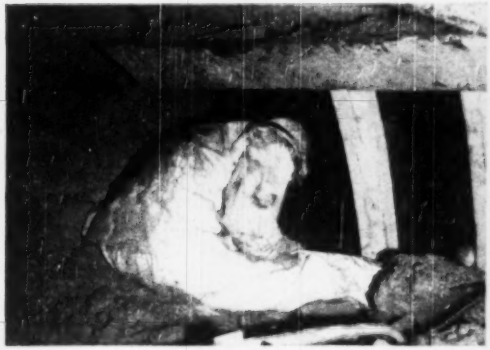
In the first 5,600 ft from the Grahamsville portal, 6,800 ft were sealed with mortar about $2.90 per lin ft, 380 ft of steel support was installed, at about $40 a foot. Engineers say they have another reason for being liberal with the mortar: tunnel workers' morale improves because they feel safer under the soft rock when it's covered. Moreover, they know the concrete slow tunneling progress the way steel installation does.

• **Earth tunneling methods**—For the soft ground portion of the discharge conduit tunnel, the contractor elected to open cut 190 ft. This left him 183 ft to tunnel. The distance was so short, he chose old-fashioned hand-mining methods as the basis of excavation for a top drift, adapting these methods to modern structural steel rib and pressed steel lagging construction (see picture series). Then he loosened the bench by blasting, for mechanical mucking and hauling. This was the final operation for excavation in the discharge conduit. Rock tunneling similar to that in the main headings progressed 150 ft per week. The slower rate was due to the presence of three horizontal curves, with intersection angles up to 40 deg., and to the necessity of placing steel roof support. Part of the services for this heading were performed at the Grahamsville portal.

The contract also includes an intake chamber (ENR Jan. 6, 1949 p. 60), a release water tunnel to the Neversink Dam diversion tunnel, an outlet chamber and hydroelectric power plant at Grahamsville and a 377-ft shaft. The shaft is excavated and lined to tunnel grade, as may be used for construction in the unlikely case that tunneling progress slows.

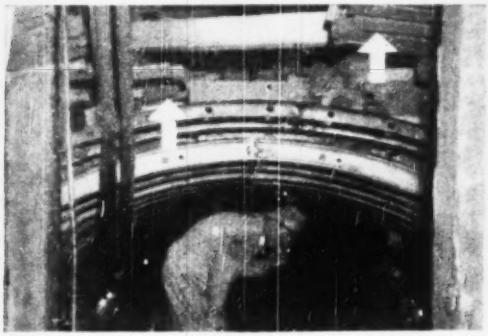
Project manager for Fraser Dave Construction Co. is Roy J. Gauther; Field superintendent, Ted McCoy; assistant superintendents, Jim Wilson, W. H. Robertson and Dean Luther; master mechanic, Hite Riggs; electrical superintendent, George Patrick. Neversink division engineer for the New York Board of Water Supply is Frank J. Musso. He is assisted by John C. Mergott at Grahamsville and Ellsworth B. Wells at Neversink.

. . . Good Tunnel Work Proceeds Step by Step at Neversink

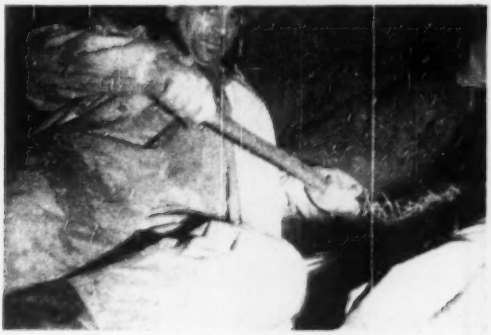


TOP DRIFT broadens out from pioneer drift, as man mucks for liner plates and for next arch rib half, which will be supported temporarily by needle beam at top.

ARCH RIB SPACER inserted for bolting, while man at left shoulders rib half to correct position on steel channel sill at springline. Bulkhead is adjacent to pioneer drift entry.



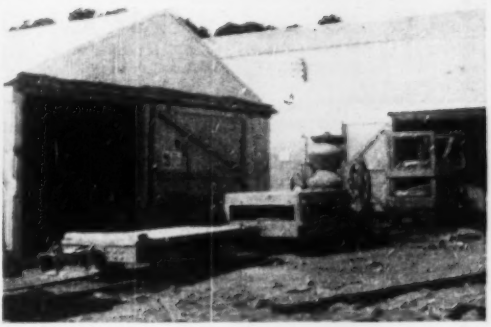
PIONEER DRIFT spearheaded work. Backward view at drift's entry shows spiling (arrows) that protected broadening-out. The spiling (tapered timbers driven over beams to act as horizontal sheetpiles) received main support from transverse timber frames.



POLING BARS also protected men mining with axes and shovels at pioneer-drift face. Excelsior was kept handy to stem minor slides. Dirt was wheelbarrowed back to bench, dumped in front of mucker, which passed it to muck cars.

Above Ground, Contractors are Ready for Emergencies . . .

READY FOR BAD ROCK—Contractors keep complete sets of sills, ribs, spacers and lagging on flat cars at the portal, for quick action when engineers order support, but . . .



LIBERAL SEALING of shale rock saves its surface from characteristic quick weathering and strength-loss, makes steel support a minor factor in cost. Three-car rock-sealing train is shown.

NEW BASCULE BRIDGE (left) parallels existing span built in 1927. Design emphasized simplicity of detail as being more attractive architecturally and less costly to maintain.

Simplicity Distinguishes Bascule Span

W. J. Deady
Associate Bridge Engineer
California Division of Highways

Aesthetic, structural and mechanical simplicity were studiously designed into a recently completed California highway single-leaf, bascule bridge.

Architectural simplicity is evidenced in the design of the heavy concrete counterweight; structural simplicity shows up in the absence of overhead bracing on the approach spans. All phases of the operating equipment are indicative of the mechanical simplicity.

The new bridge crosses the San Joaquin River at Mossdale, on U. S. Highway 50, a principal artery between the San Francisco Bay area and the San Joaquin Valley. It parallels an existing single-leaf Strauss bascule built in 1927. The new bridge has a 176-ft bascule lift span and four 111-ft 0-in spans. The old bridge also included a 124-ft lift span as well as a variety of approach spans.

Both bridges provide a clear channel opening of 88 ft between fenders. The roadway widths are 24 ft on the old bridge and 27 ft on the new. The old bridge was designed for an H15 loading and the new for H 20 S 16.

• **Attractive design** The California bridge department is attempting to make bridges look attractive without adding any appreciable cost. In bascule bridges, the heavy overhead concrete counterweight has historically been an ugly feature. But triangular holes through the counterweight, and curving it to fit the general form, makes the mass of concrete an architectural asset instead of a liability.

Purpose of attention to attractive, clean-cut details is twofold. Driving hazards are reduced because driver distractions are lessened; maintenance costs are lowered. State engineers predict that maintenance costs on the new span will be significantly less than similar costs on the existing structure. Much of such a reduction is attributed to simpler details.

The holes give the counterweight the appearance of a Warren truss—this is the truss system used throughout the bridge. There is a reason for thus shaping the concrete for it is just about a Warren truss that serves as the counterweight support and as the structural tie between the longitudinal trusses on the lift span.

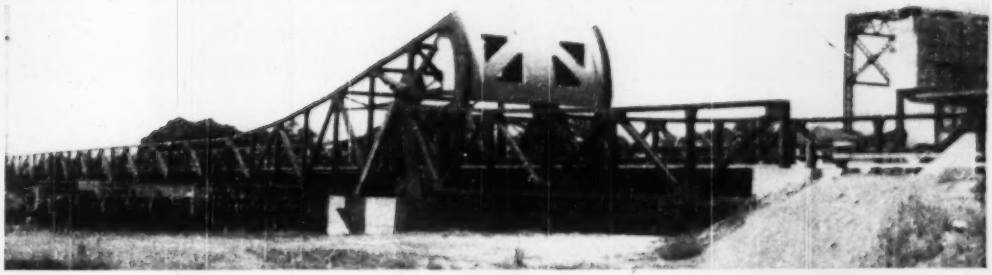
It makes up for weight taken out by the triangles, pig iron ingots, stacked in recessed areas of the counterweight make up for weight taken out for the triangles and help in final balancing of the span.

Design attention was also directed to reducing overhead bracing in the new bridge. Considerable difficulty has been experienced in California because of high-piled loads on trucks hitting portal struts and lateral braces of truss spans. Accordingly, at Mossdale, all overhead bracing was eliminated from the approach trusses. Some overhead framing is necessary on the bascule leaf, but this is kept to a minimum.

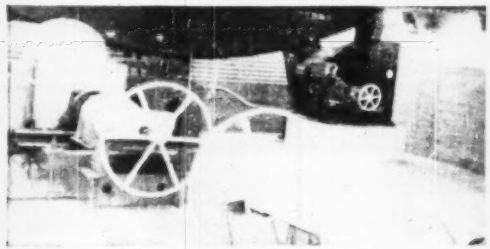
• **Well-balanced structure** Of prime importance in bascule design is balance of the lift section to require minimum lifting effort. This has been so well accomplished in the new bridge that two men operating hand wheels can manually open the span at power fails.

The segmental gear rack is supported by enclosed steel box girders. These were filled with steel punchings and grouted to keep the steel from rattling. This helped provide weight in the short counterweight end of the lift span.

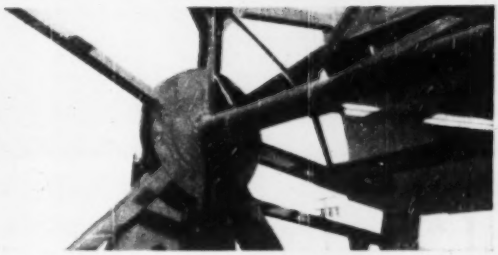
This good balance permits use of relatively low powered mechanical lift



EVEN THE CONCRETE COUNTERWEIGHT—usually the ugliest part of a bascule span—was made to look attractive.



HAND WHEELS lift the movable span in case of power failure; jacks take load off main bearings when span is closed.



GUSSET PLATES were shrunk fit on the trunnion. Bearings are located on the outside of the span behind the plates.

ing equipment. The main drive mechanism is powered by two 15-hp, crane type, wound rotor induction motors with built in gear reduction and solenoid brake. Each motor drives an independent gear train that engages a segmental rack on one of the bascule trusses. Power is applied to the two motors simultaneously from a common control, but they are otherwise independent. The slip characteristics of these motors are such that the load is automatically divided between them.

The two motors are located under the roadway on the trunnion pier. The driving and braking mechanisms are fully enclosed units for weather protection. For repair purposes, the entire assembly can be removed by loosening several clamping bolts.

To operate both bridges, a new operator's house was constructed between them on the east bank of the river. All controls are centralized at this location and both bridges are controlled entirely from this one point—except for one traffic gate. Control of the west gate of the new structure is provided outside of the control house at a point where both the gate and the traffic are more clearly visible.

Although controls are located at a common point and may be operated simultaneously, the mechanism of each bridge operates independently. The entire operating sequence for the two bridges is established by electrical equipment, and an interlocking control provides that all operations are carried out in the proper order. Only 1-2 min is required for the new span to travel from the fully-closed to the fully-opened position after the locks have been drawn.

• **Trunnion has two bearings**—The trunnion design of the new bridge is unique in that a single shaft requiring but two bearings is utilized. This shaft is 30 ft 9¼ in. long, weighs 25 tons, and has a maximum diameter of 25 in. A core hole 6 in. in dia was bored the full length of the shaft. Gusset plates were shrunk fit onto the shaft—an operation that required precise machine work.

The vertical reaction of the bascule span is supported on two cylindrical, roller-type, self-aligning, anti-friction bearings, one at each end of the trunnion shaft. These roller bearings rank among the largest ever used on this type bridge, each bearing supporting an 800,000-lb load.

Thrust bearings are also provided to resist wind loads.

A portion of the load on the bearings is relieved when the bridge is in a closed position by two tail-lift jacks. Each of these jacks produces a positive reaction of 10,000 lb under each truss.

• **Open grid flooring**—Common practice indicates use of open grid flooring in the lift span. However, such flooring is used throughout the new bridge. This application is of an experimental nature aimed at decreasing the dead load of the deck system. It was accomplished without any increase in construction costs.

Rounded steel curbs and metal hand rail give the deck a light but sturdy appearance.

The new structure is located about 15 miles south of Stockton, Calif., and is a unit of an additional two-lane improvement that provides a four-lane highway between San Francisco and San Joaquin Valley points. Under the new traffic set-up, the old bridge now carries westbound traffic while the eastbound traffic uses the new bridge.

The new structure was built under two separate contracts, one for the substructure and one for the superstructure. Contractor on the substructure was Lord and Bishop, Sacramento, Calif. Superstructure contract was handled by Judson-Pacific Murphy Co., Emeryville, Calif. It, in turn, sublet the machinery work to Moore Drydock Co. and the electrical work to the Enterprise Electric Co., both of Oakland, Calif.

The bridge was designed and constructed by the bridge department of the California Division of Highways under the direction of F. W. Panhorst, assistant state highway engineer (bridges). The author was resident engineer on construction.

San Angelo Dam—Seven-Mile Earthfill

RIPRAP PLACEMENT by this crane, wielding an orange peel bucket, has gone as high as 800 cu yd a day. A bulldozer keeps its rock supply piled at the toe of the dam.

PLANNED TO STORE 391,500 acre-ft of water for parched West Texas, San Angelo Dam is now nearly 40 percent complete. This $18,500,000 project of the Corps of Engineers is on North Concho River, a tributary of the Colorado River of Texas.

When finished in 1951, the seven-mile-long earth dam will form a 12,700-acre reservoir.

Work started in May, 1947, when the Fuller Construction Co. of Shreveport, La., began construction of a portion of the embankment. A second contract for constructing another section of embankment was awarded to the Hughes Construction Co. of Waxahachie, Tex. At the present time Winston Brothers Co. and Taylor-Wheless Co. of Minneapolis, Minn., are engaged in completion of the rolled earth placement and building a service bridge and spillway; Nelan Bros. Construction Co. of Minneapolis, Minn., is constructing the concrete outlet works.

• **Outlet nearly finished**—The outlet works will consist primarily of a gated intake structure and two 18-ft dia discharge conduits through which water stored in the reservoir will be discharged. Low-flow outlets for discharge of conservation waters will consist of two valve-controlled 30-in. dia conduits. The discharge conduits, the lower portion of the intake structure and the stilling basin are near completion. The contractor now is constructing the control tower which will house the machinery for operating the slide gates.

In his concreting operations at the outlet works, the contractor uses a single-drum paving mixer. Concrete is emptied into a hopper skip and carried to the forms by elevator. Aggregates and cement are dry batched at a nearby plant and transported to the mixer by trucks.

• **Spillway concreting methods**—The concrete spillway section (three miles from the outlet works) requires larger quantities of concrete. Here a dual-drum paving mixer is used, and concrete is hoisted by crane in 14-cu-yd buckets to the point of placement. It is consolidated by internal electric vibrators. Finished surfaces of flat slabs are obtained by a vibratory reciprocating screed.

Vertical and sloping surfaces are waterscured for 14 days. A membrane-curing compound is used on the horizontal finished surfaces. During freez-

ing weather, wood-burning salamanders were placed under canvas covers to prevent freezing of the concrete in the curing period.

Water for mixing and curing operations is obtained from the nearby North Concho River and is stored in 10,000-gal storage tanks.

• **The earthfill operation**—Construction of the rolled earth dam involves placing and compacting 11,461,000 cu yd of fill. Some 500,000 cu yd are being placed each month—a better-than-schedule average.

Various types of soils are going into the long embankment; the north end and center portion contain caliche; the south end is principally red bed fill. Materials come from borrow areas upstream and from the spillway excavation.

The contractor uses a dragline with a 3-cu-yd bucket, a loader with a capacity of 500 cu yd per hour and dump trucks in earth moving operations. Fill is spread by bulldozers and motor graders to a 6-in. layer and is disk-plowed; water is added when necessary. Whenever possible, however, the soil is wetted in borrow pits before the placement operation with water from wells or the nearby river. Sheepsfoot rollers, exerting a pressure of 450 psi, are able to compact the fill in six passes.

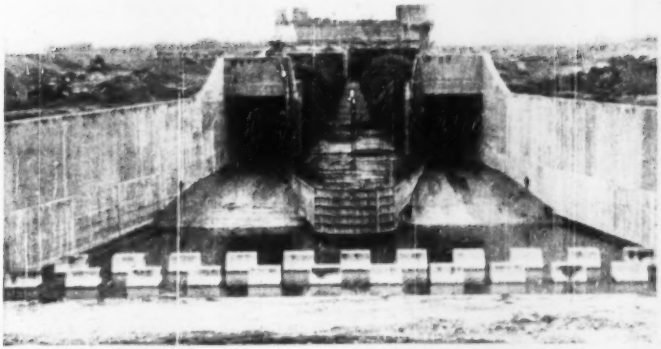
Uniform density of the earth is obtained right up to the finished slopes by compacting the fill slightly beyond finished grade and then dressing it back to neat lines. An exceptionally uniform slope surface is obtained by dressing the side slopes with a cable drag pulled by two tractors, one operating on top of the fill and the other at its toe.

For night operations, twelve light towers, each equipped with generators and six 1,000-watt floodlights, were erected. The towers are on skids and are movable as the contractor's work may demand.

Riprap is now being placed on completed upstream slopes of the embankment by cranes equipped with orange peel buckets. Rock is brought from near San Angelo in cable dump trucks of 10-cu-yd capacity. Downstream slopes are being grassed to protect the surfaces from erosion by wind and rain.

Lt. Col. Ellsworth L. Davis is district engineer of the Galveston District. The San Angelo project is under the immediate supervision of J. R. Simpson, resident engineer. Plans and specifications were prepared by the district's engineering division under H. R. Norman—who has been succeeded by M. A. Dillingham; the construction division is under the direction of Kenneth Smith.

OUTLET WORKS above the dam will have six 7.5x14.5-ft sluice gates operated from a 145-ft control tower now being built. Two 18-ft dia. discharge conduits pierce the dam.



STILLING BASIN at downstream end of twin conduits is shown here nearly finished. Spillway for floodwaters is three miles away.

CABLE DUMP TRUCK bring in the rock for protection of the upstream slope. (Corps of Engineers photos)

Here's A Way—

To Tackle Pollution Abatement

There's an important problem that plagues many a thinking sanitary man, when he starts out on a state wide stream pollution cleanup.

The problem is one of economics.

Just who is going to use the water that you've cleaned up? For what? Is it worth all the money it's going to cost the community and industry?

In other words, do you need 100% cleanup, or will 50% do? Your answer will have a lot to do with the cost—and with the ease with which you sell your program and get it under way.

Most states have attacked this problem the easy way. Divide the state more or less arbitrarily into zones, set up quality standards for each zone, and see to it that everyone complies.

There's a couple of flaws in that system—number one being that you may get 100% purity for a water supply to a plant or other use that doesn't need water that pure, so somebody has spent more money than he needs to.

• **Different Approach**—In California—where a newly-created Water Pollution Control Board is now functioning—they think they have an answer.

They're dividing the state into regions according to major watersheds (ENR April 27, p. 13). And within those regions, they'll do two things:

1. The potential of all bodies of water for natural purification as well as pollution assimilation will be weighed against the present and future uses of those waters.

2. They'll administer pollution abatement on a local level.

• **Policy set forth**—The basic concept of the State's Pollution Control Law—unique among pollution-regulating agencies—was enunciated in a policy statement by the state board at its first meeting last January. Among other things, the Board declared that its actions will be "directed to secure that degree of care in planning and operating works for treatment and disposal of sewage and industrial wastes that will adequately protect public health and all beneficial uses of waters in this state, and at the same time permit legitimate planned usage of those waters for receiving suitably prepared wastes, so that an orderly

TABLE I—SUGGESTED METHOD FOR ANALYSIS OF WASTE-DISPOSAL PROBLEMS

PART	OBJECTIVE	WASTE	RECEIVING WATER	BENEFICIAL USE
I	Compare public and private interest, the interest being to preserve beneficial uses of water involved	Step 1 - Get the Facts a. Necessity for disposal b. Assessed valuation of source of waste c. Number of people identified with waste source	Step 2 - Determine or estimate zone of influence for these effects a. Bacterial b. Biochemical c. Physical d. Chemical	Step 3 - List beneficial uses and these data a. Necessity for use b. Assessed valuation involved in use c. Number of people identified with use
II	Effects of discharge of wastes	Step 1 - Record these data a. Waste Volume (gpd) b. Bacterial, biochemical, physical and chemical characteristics of waste	Step 2 - For receiving water intermixed with waste, list a. Volume of flow (cfs) b. Bacterial, biochemical, physical and chemical characteristics before waste discharge c. Same characteristics in (b) after discharge	Step 3 - For each beneficial use affected by waste, record a. Volume water used (gpd) b. Optimum bacterial, biochemical, physical and chemical characteristics associated with beneficial use c. Maximum or limiting values of bacterial, biochemical, physical or chemical characteristics beyond which beneficial uses for practical purposes would be destroyed
III	Balance requirements of waste disposal against those of water use	Step 2 - Compute degree and cost of treatment to maintain a. Limiting values of quality characteristics required by each beneficial use b. Optimum values as under (a)	Step 3 - From data Steps 1 and 2, Part III and relative values, Part I, determine by judgment a. Uses for which optimum values of quality characteristics are to be maintained b. Uses to be kept between optimum and limiting values c. For uses in (b), the degree to which optimum values may be exceeded for best overall solution to the problem	Step 1 - From Steps 2 and 3 Part II, tabulate a. Beneficial uses destroyed by waste discharge b. Beneficial uses damaged but not destroyed by waste discharge
IV	Translate decisions in Step 3 Part IV into actual effluent requirements			

growth and expansion of cities and industries may be possible."

To balance out these engineering and economic objectives, a simple procedure for evaluating pollution problems effectively has been outlined by one of the Board's committees. The evaluating procedure is as yet tentative—especially as to water-quality requirements. And that's one reason that the procedure has been made available just to ENGINEERING NEWS-RECORD. The Board would like to receive full comments from interested parties before the procedure is adopted finally.

The method for analyzing waste-disposal problems aims to provide a "basis for arriving at appropriate requirements pertaining to a waste that will prevent pollution as defined in the statute." (ENR July 21, 1949 p. 29).

• **Analyzing waste problems**—Waste-problem studies will be divided into four-part investigations under the headings of Waste, receiving water and beneficial use (Table I). The parts:

I Compare relative public and private interest in solving the waste problem, the interest being to preserve the beneficial uses of water involved.

II Sum up effects of waste discharge.

III Balance requirements of waste disposal against those of water use.

IV Translate findings and decisions (III) into actual effluent requirements.

Each part consists of step-by-step procedures for collecting basic engineering, scientific and economic data, for placing it side by side for ready comparison, and for drawing logical conclusions from the comparisons.

An application example of this procedure for analyzing Los Angeles' sewage problem and concluding that complete treatment is required and justified—is given in Table II. (This problem is, of course, only of historic interest because the Hyperion plant will be finished this year.)

Tentative water-quality requirements are tabulated in Table III. Significant in the proposed requirements is the specifying of both maximum and optimum (most favorable) standards. Most standards specify only maximum values.

• **Zoning not feasible**—Many states have erected water-pollution-control programs upon planned zoning of streams according to major uses (and abuses) of water. Within each zone, they have been established water-quality standards designed to be consistent with those uses.

This method, the Board concedes, has powerful advantages: It lets waste-producing agencies and activities know very definitely where they stand. And it furnishes a simple basis for administration of a control program.

But it has equally compelling objections, the Board feels, when applied to California's. The objections:

1. Uses of waters within a zone are by no means uniform.

2. Effects of pollution are not uniformly dispersed throughout a zone from a source of pollution. They are restricted geographically.

3. A successful program must recognize that need for economical waste disposal is just as exacting as that for protection of water quality for beneficial uses. Lacking either, there can be no sound development. Waste treatment always consists of a combination of artificial treatment plus

TABLE II—ANALYSIS OF LOS ANGELES' SEWAGE PROBLEM ON BASIS OF "POLLUTION"

	WASTE	RECEIVING WATER	BENEFICIAL USE
	SEWAGE FROM HYPERION OUTFALL	SANTA MONICA BAY	BATHING AND SWIMMING
PART I	Necessity: Huge volume of sewage requires it to be discharged into surface waters capable of diluting it so as to prevent septicity. Reclamation may substantially reduce average volume but not peak volume requirements.	Zone of influence Bacterial effects Hermosa Beach to Santa Monica Biochemical effects Very limited Physical effects Hermosa Beach to Santa Monica Chemical effects None	Necessity: From standpoint of climate, accessibility, water currents, beach width and beach slope, this area is choice and impossible to duplicate elsewhere.
	Assessed Valuation L. A. City: $2,300,000,000 Number of people: 1,800,000		Assessed Valuation: Hermosa Beach to Santa Monica: $129,000,000 Number of people L. A. County (½): 2,000,000
PART II	Volume of waste: 200 mgd Characteristics of waste Mixed sewage and industrial waste from 2,000,000 people after screening only Coliform: 100,000 + /ml Suspended solids: 400 ppm	Vol. of "Flow": 1000 + 1 Dilution Characteristics w. o. discharge Coliform: < 1/ml No visible solids or grease Characteristics after discharge Coliform greater than 10/ml Visible solids and grease	Volume used: Entire stretch of Beach Optimum characteristics Coliform less than 1/ml No visible solids or grease Limiting Values Coliform 10/ml Traces of solids and grease
PART III	Cost to maintain limiting values: Primary treatment, chlorination and outfall: $30,000,000 Cost to maintain optimum values: High rate activated sludge Treatment, outfall and chlorination: $43,000,000	CONCLUSIONS Both discharge and use are necessary. Number of people involved in use justifies maintaining optimum conditions. Cost of maintaining optimum conditions is not out of line with assessed valuation of the city that must pay for treatment.	Beneficial use destroyed. Bathing and swimming and use of Beach from Hermosa Beach to Santa Monica. Beneficial use damaged. Bathing and swimming for five miles north of Santa Monica and in Redondo Beach as well as in area described above.
PART IV		Provide complete treatment.	

utilization of natural purification resources. And economy of waste disposal requires that maximum emphasis be placed on the latter.

4. Perhaps the greatest limitation to a zoning program, the Board points out, is that it always tends to be fixed or permanent and does not lend itself to flexibility in reclaiming lost water quality or upgrading a degraded area.

• Reasons for individual analysis—For these reasons, members of the committee on water quality criteria rejected application of the zoning procedure to California's problems. They are of the firm conviction that a method for establishing requirements of waste disposal in each region must be followed that will consider these key points:

1. Total interest in a water pollution control program encompasses both economical waste disposal and preservation of beneficial uses of water.

2. Waste disposal requirements must recognize the zone of influence of wastes with respect to bacterial, biochemical, physical and chemical effects, and be only severe enough to protect some beneficial use of water (including simple aesthetic enjoyment) within such zone of influence.

3. Account must be taken of both present and future planned quality of a receiving water in setting forth requirements for disposal of a waste.

4. Requirements in all cases must be reached by logical analysis of all pertinent factors of a given problem. This is in sharp contrast to simple reference to an arbitrary general rule so that—when examined judicially in court—they will not be reversed.

5. The definition of pollution in the California law is restricted to impairments of water quality which unreasonably affect such waters for beneficial use. Some beneficial uses of water will suffer to some extent from disposal of wastes. To insure that such effects are not unreasonable, account must be taken of the fact that every beneficial user imposes two values on each of its water quality requirements. An optimum value (most favorable degree) below which use is not damaged to any significant degree by pollution, and a maximum or limiting value above which beneficial use is to all practical purposes inhibited or destroyed (Table III).

6. Ground waters are of paramount importance in California, and damage to them is long lasting if not permanent in nature. Surface waters, on the other hand, recover rapidly when the source of pollution is removed. Risks of accidental pollution of ground waters, therefore, cannot be tolerated.

For these reasons, the new method for evaluating waste problems individually has been drawn up.

• Regional boards—Initial decisions for abating pollution will be made by the regional boards. The state board will act as a "court of appeals," for these decisions. But it has authority to step into the local picture whenever a regional board fails to take appropriate action.

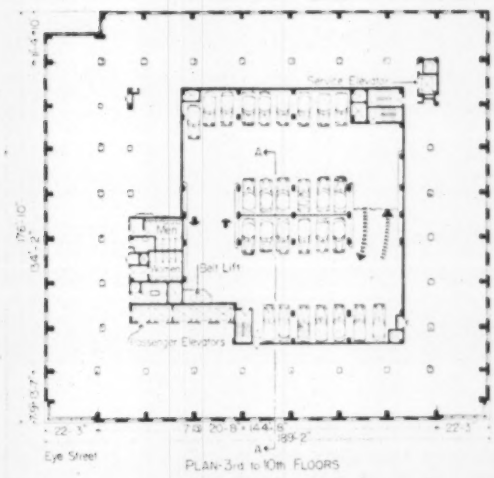
The evaluating procedure outlined above will, therefore, be utilized only in cases coming before the state board. Regional boards may employ it.

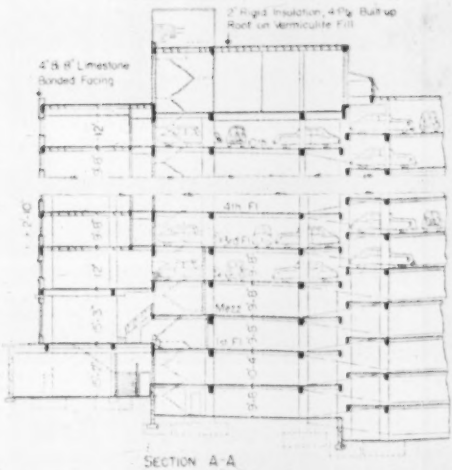
• Technical committee—The evaluating procedure and water-quality requirements is the work of a special committee. This group included A. M. Rawn, general manager and chief engineer of the Los Angeles County Sanitation Districts; G. E. Arnold, director, San Diego water department; Don McMillan, city manager, Pasadena; and Frank Stead, acting executive director of the Board.

TABLE III—TENTATIVE WATER-QUALITY REQUIREMENTS

USES	RECREATION: Domestic Water Supply	RECREATION: Shellfish Culture	RECREATION: Bathing & Swimming (Fresh W.)	RECREATION: Bathing & Swimming (Salt W.)	RECREATION: Boating & Fishing	WILDLIFE PROPAGATION: Fish (Fresh W.)	WILDLIFE PROPAGATION: Fish (Salt W.)	WILDLIFE PROPAGATION: Fowl (Refuge)	IRRIGATION: Truck Crops: Vegetables	IRRIGATION: Citrus Fruits	IRRIGATION: Other Crops	INDUSTRIAL: Food Processing (Fresh W.)	INDUSTRIAL: Food Processing (Salt W.)	INDUSTRIAL: Cooling & Other (Fresh W.)	INDUSTRIAL: Cooling & Other (Salt W.)	AESTHETIC: Enjoyment
1. Bacterial																
Coliform Opt (per ml)	1.0	1.0	None	1.0	10	10	10	100	1.0	10	100	0.1	1.0	1.0	10	
Coliform Max (per ml)	50	5	1.0	10	100	100	100	1,000	10	100	100	1.0	1.0	10	100	
2. Organic																
BOD Opt (ppm)	None	5	5	5	10	10	10	50				None	1	5	5	20
BOD Max (ppm)	0.5	20	10	10	30	30	30	50				5	5	10	20	100
D. O. Opt (ppm)	5	5	5	5	5	5	5					5	5	10	10	5.0
D. O. Min (ppm)	2	2	2	2	2	1	2	2				1	1	1.0	1.0	4.0
Oil Opt (ppm)	None	None	None	None	None	None	None	None	None	None	None	None	None	5	5	None
Oil Max (ppm)	2	2	2	2	5	5	5	5	5	5	5	5	5	10	10	10
3. Reactive																
ph Opt	6.8	6.8	6.8	6.8		6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	4.0	4.0	
	7.2	7.2	7.2	7.2		8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	10.0	10.0	
ph Critical	6.6	6.6	6.5	6.5		6.5	6.5	6.5	6.0	6.0	6.0	6.0	6.0	4.0	4.0	
	8.0	8.0	8.6	8.6		8.5	8.5	8.5	9.0	9.0	9.0	9.0	9.0	10.0	10.0	
4. Physical																
Turbid Opt (ppm)	5	5	5	5	10	5	5	10				5	5			50
Turbid Max (ppm)	20	50	20	40	50	10	20	100				20	50			
Color Opt (ppm)	10	10	10	10	10	5	5	10				10	10			20
Color Max (ppm)	10	50	10	10	50	10	20	100				10	50			100
S. S. Opt (ppm)	10	10	50	50		10	10	50				10	10	50	50	
S. S. Max (ppm)	100	100	100	100		20	50	250				50	100	150	150	
Float'g Opt	None	None	None	None	None	None	None	Slight				None	None	None	None	Slight
Float'g Max		Cross	None	Cross	Cross	Cross	Cross	Cross				None	Slight	Slight	Slight	Cross
5. Chemical																
T. S. Opt (ppm)	500					1,000			500	500	500	500		1,000		
T. S. Max (ppm)	1,500					5,000			1,500	1,500	2,000	1,500		1,500		
Cl Opt (ppm)	250					1,000			200	100	250	500				
Cl Max (ppm)	250					2,500			750	500	750	1,000				
B Opt (ppm)	0.5	1.0							0.5	1.0						
B Max (ppm)	1.5								1.0	2.0						
F Max (ppm)						0.5	0.5		0.1			None	None			
Tox. Met. Opt (ppm)	None		0.1	0.5		10	10		2.5			0.1	0.5			
Tox. Met. Max (ppm)	>0.5	0.1	5	10								1	5			
Phenol Opt (ppb)	1	1	5	50	1	1	5	5	5			10	50			
Phenol Max (ppb)	5	10	50	1	10	1	5	25	20							
Boron Opt (ppm)										0.5	1.0					
Boron Max (ppm)										1.0	2.0					
Sod. Ratio Opt (%)									35-50	35-50	35-50			90		
Sod. Ratio Max (%)									60	75	80			60		
Hardness Opt (ppm)	100													100		
Hardness Max (ppm)	350													500		
6. Temp. Max (deg)	60	70	65	65		80	60									
7. Odor Max	N	N	N	N	M	M	M	M	O	O	O	M	M	O	O	O
8. Taste Max	N	N	N	D		M	M	M				M	M			

N—Noticeable M—Marked D—Objectionable O—Objectionable





GARAGE CORE of the 10-story Cafritz Building in Washington, D. C. will accommodate 450 autos on 27 levels.

"Park-at-Your-Desk" Office Building

PARKING will not be a problem for the tenants of the Cafritz Building, a 10-story, air-conditioned office building now going up in Washington, D. C. They will be able to drive their cars to the floors on which they work and park there.

About one-third of the interior of the 189x177 ft structure has been allotted for this purpose. The garage core occupies 11,450 sq ft of the 55,-160 sq ft gross area of a typical floor. Office space is located along the perimeter of the building, which has windows on all four sides.

• **Why design was chosen**—Architect Le Roy L. Werner, of Washington, points to the following advantages of this design:

1. The building completely covers a large, nearly square lot, yet office space is located in the most desirable position—around the outside. The architect felt that, even with air conditioning, prospective tenants all wanted windows.

2. From a rental standpoint, the garage occupies the least desirable portion of the building. A light court in this space would be a waste of expensive real estate.

3. The garage will be mechanically ventilated but not heated or air conditioned, nor will it require any finish on walls, floors or ceiling.

4. The first floor and basement are rentable areas that might have been lost if parking space for all tenants had been provided on these levels.

5. The most suitable column spacing was selected for the garage and for the office areas. A garage in the lower stories might have required column spacing that would not fit office layout requirements.

• **Split-level garage**—Space will be available in the interior of the 10-story Cafritz Building for parking 450 automobiles on 27 levels. These levels are on either side of the center line of the core, those on one side being flush with the office floors and those on the other side being a half-story lower. They are connected by a two-way ramp, which has a maximum grade of less than 15% and a minimum width of 24 ft.

Tenants who do not wish to drive up the ramp will find attendants available to park their cars for them. Transients and visitors will also be accommodated, but they will park in the lower stories for both ingress and egress. Or attendants will take the cars to the subbasement for washing or lubricating.

For those not driving up, five self-leveling, push-button elevators, with automatic control and signal system, will provide rapid transportation to all floors. Garage attendants will use a vertical belt lift.

• **Other design features**—The office portion of the building will feature fluorescent lighting, acoustical ceilings and under-floor electric conduits for flexible space use. A high-velocity air conditioning system, with small-diameter risers, will serve outer areas, and a conventional duct system the interior areas. Compressors, cooling tower and fans will be in a penthouse.

The building has a reinforced concrete frame and floors. Cafritz Construction Co. is erecting the $7,000,000 structure, with Norman G. Kindness as superintendent of construction, and expects to finish it late this year. Beall & Le May, of Washington, were the structural engineers.

Parking garages planned

To relieve congestion, the N. Y. City traffic commission has announced the sites for five off-street parking garages and a parking field which the city hopes to build through a city parking authority. Garage sites are: 60th Street near the Queensboro Bridge; block bounded by Baxter, Worth, and Mulberry streets and Park Row; Fordham Road and Elm Place in the Bronx; near Brooklyn Civic Center; and the block bounded by Fulton, Henry and Middagh Streets in Brooklyn. The parking field would be bounded by the Long Island R.R., Liberty Ave., N. Y. Ave., and 160th Street in Queens.

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READER COMMENT

Tank-Bottom Treatment

Sir: In the issue of the ENGINEERING NEWS-RECORD, February 23rd, your article on "Steel Tank Turns a City Reservoir" gave the description of the unusual bottom treatment unorthodox as far as standard flat bottom tank practice is concerned.

The Tropical Oil Co., Marketing Department, subsidiary of Standard Oil Co., N. J., has used this same system since 1941 on welded tanks.

The work was done by D. & S. Construction Co., of Wilmington, California, under the supervision of our Construction and Maintenance Section, on two 55,000-barrel welded cone roof tanks. The bottom and first ring were built on cribbing, the bottom scraped and painted with two coats of red lead and later with two coats of asphalt paint, similar to the coal tar enamel mentioned in your article. The tanks were tested and lowered on the sand cushion impregnated with Fuel Tanker fuel.

Our company has used this system of construction in erected tank building many years. Although it adds to your initial investment, it goes a secondary in lasting and adds life to the tank.

We would be interested to know how wooden roofs would reduce maintenance costs, as the system used must be very expensive and steel roofing, if properly painted will in our opinion, last much longer than any wooden roofing material.

As this article mentioned this system as meritorious, I am of the opinion that to extend the life of tanks is worth the small addition to the initial investment and should be considered orthodox.

H. A. LEELER
Chief Engineer, Marketing Dept.
Tropical Oil Co., Columbus, S. A.

A "Supreme Court" of Engineers?

Sir: The Hoover Reorganization Plan has recommended the establishment of a so-called Board of Impartial Analysts to pass on all major Public Works Projects. Recently Senator Joseph C. O'Mahoney of Wyoming introduced an amendment to the omnibus Rivers and Harbors and Flood Control Bill, now pending in Congress, to establish such a Board. In each case, the Board members are to be appointed by the President. In fact, a temporary Board along the same lines has already been appointed by the President and is known as the Temporary Water-Resources Policies Commission.

Under all these proposals, the members of this Board would be Presidential appointees and would be under pressure from the Executive, to say nothing, we daresay, of pressure from subordinate levels. We are thoroughly in accord with this general idea, but venture to carry it one step further. Here, it seems, is one of the few practical opportunities ever offered in Government to give top-level recognition to the Engineering profession similar to the ultimate in recognition open to the Legal Profession in Supreme Court appointments. Not only to remove the possibility of political pressures, but to establish a Board, Commission or call it what you will of unassailable reputation, character and ability, let the appointments be for life, for men of highest attainment in the Engineering profession.

The Board would review important matters in a judicial capacity not unlike that of the Interstate Commerce Commission and the Federal Communications Commission. If the country is to be deprived of the long established efficiencies and competence of the Board of Engineers for Rivers and Harbors of the U. S. Corps of Engineers in the Civil Works Program, there should be some new agency of comparable stature and qualification to take its place.

Perhaps the term "Supreme Court" is a misnomer in this discussion. It at least reflects the stature, the standing and the comparative level within Government of the Board and the men we would choose for the task of coordinating the development of our water and land resources.

Under the arrangement we contemplate, members of the Board would be expected to submit their reports and findings to the Congress, both from a majority and minority standpoint.

Just as Congress holds the purse strings now, so would it have no excuse for approving unsound projects.

As to salary, we suggest a pay level in every way comparable to that of the Supreme Court.

This suggestion, it seems to us, would perform a two-fold task. It would rid our resources development programs of political hangers-on and theorists and by placing responsibility therefor in the hands of the nation's top-notch engineering brains, it would give to the Engineering profession the

Continued on page 48

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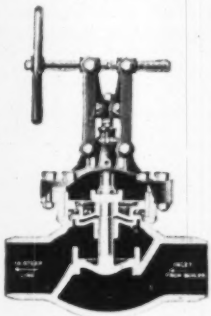
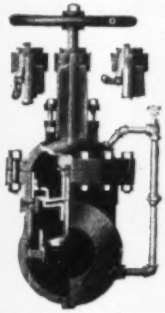


G-A Single Acting Non-Return Valve, Toggle Yoke Design, Globe Pattern



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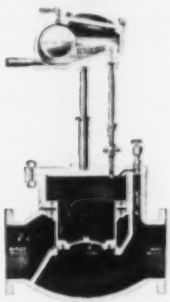
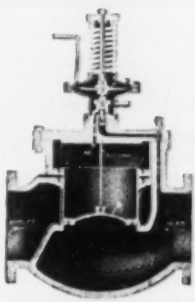
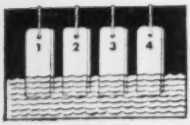


G-A High Pressure Controlling Float Valve, Globe Pattern



G-A Single Acting Altitude Valve, Globe Pattern



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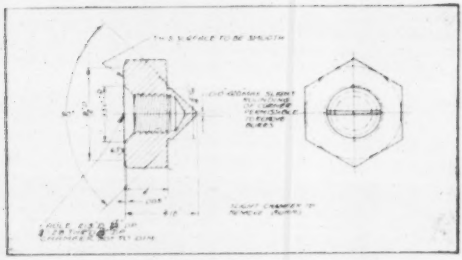

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AMERICA'S STANDARD FOR OVER 25 YEARS

(Continued from page 46)

same high recognition which for years, in Government, has been open to the Legal profession.

Hudson Bixby, *Chairman,*
Committee on Stream Sanitation
Cincinnati Chamber of Commerce
Cincinnati, Ohio

More Road Federal-Aid Unwise

Sir: Recent issues of the News-Record have reported some disagreement within the highway engineering profession concerning a proposed increase in the amount and the share of federal funds for the highway system. The problem needs further discussion.

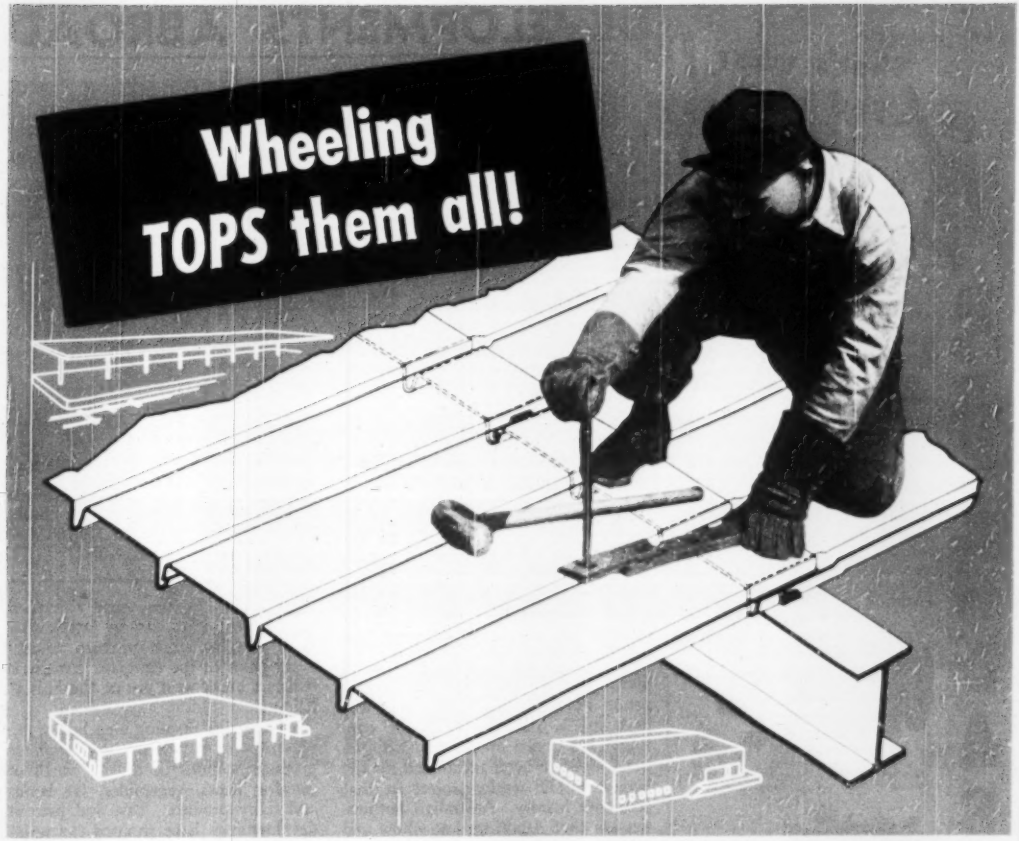
The highway system is inadequate, in poor repair, and antiquated for the most part. The expenditure of many billions of dollars for its improvement is desirable and can be justified economically. However, asking the federal government for a large portion of these funds is not justifiable. The policy of so doing is simply avoiding the issue of taking the problem to the people. The majority of the voters are of the motor-vehicle era. They want good highways. They pay seemingly exorbitant tolls to use well-planned, safe roads. They will support increases in gas taxes, license fees, paving assessments, bond issues, etc. at the state and local levels if they are acquainted with the facts. The job of the highway engineering profession is to acquaint the people with the problem and seek their support.

The policy of asking more and more money from the federal government, not only for highways but for all types of construction, must be one of the major incongruities of all time. The facts are:

1. The federal government is in debt to the extent of some 260 billion dollars.
2. Many state governments are free of debt, many actually have surpluses, the indebtedness of the remainder is inconsequential and their credit is good.
3. By and large, local governmental units are in as good financial condition as the states.

How can engineers and level-headed leaders in the construction, materials, and equipment businesses logically support a policy which advocates higher federal subsidies when, in addition to the foregoing circumstances, the national government is now operating on a deficit budget? Asking the government may be easier than asking the people, but it is not wiser.

John J. O'Mara
Assistant Professor
State University of Iowa,
Iowa City, Ia.



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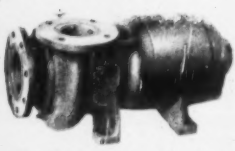
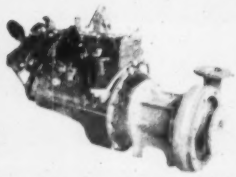
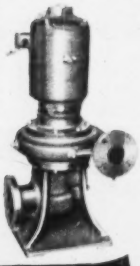


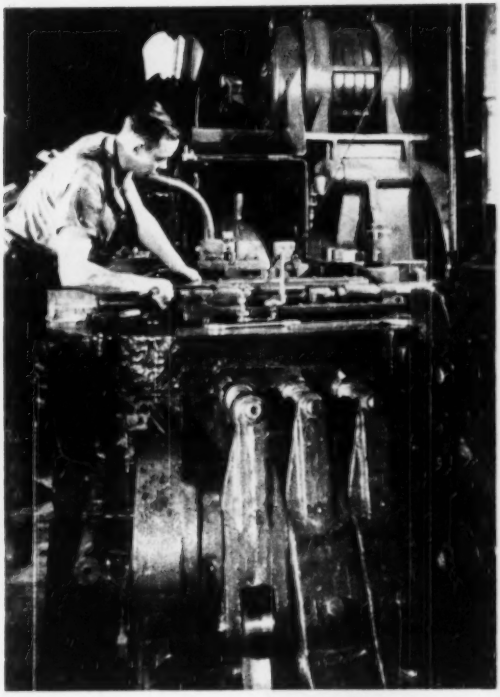
Weinman General Service UNIFLOW handles up to 1000 G.P.M., heads to 500 ft.



Weinman Single Stage, End Suction Centrifugal pumps are close coupled to gasoline engine, flat belt, V-belt or motor drive, and sheet mounted.



Weinman Type [illegible] Pumps are [illegible] for [illegible] service [illegible] [illegible] [illegible]



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Judd Barner operates a Lorain Power Shovel for the Dallas County Road Commission, Fordyce, Arkansas. Says Judd: "It is a tough little machine and I enjoy operating it."

Men like Judd Barner who are helping to build a better America know that a machine —like a man—is only as strong as its muscles . . . which, in the case of Judd's shovel, are its fasteners.

To be sure its shovel will withstand the bone-rattling service Judd will give it, The Thew Shovel Company insists upon top-quality fasteners—which pay off in dependable performance out on the job.

John Waring operates a bolt-maker in RB&W's Port Chester plant. Automatic cold-heading, which RB&W originated, accounts for the superior strength, greater accuracy, almost perfect uniformity and improved appearance of RB&W bolts.

Here, and in other manufacturing steps, RB&W builds into its bolts and other fasteners the maximum soundness that enables them to resist the shocks of such service as Judd Barner and his shovel will give them.

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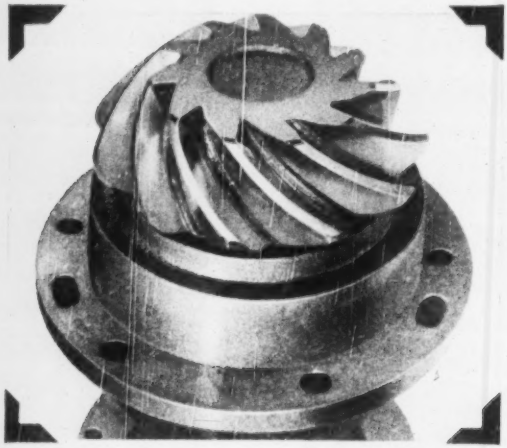
STANDARD ENGINEER'S REPORT

DATA

LUBRICANT RPM Multi Service Gear Lubri.
UNIT "Semi" Truck and Trailer
PART Final drive-Timken U-200 Axle
CONDITION Long distance freight haul-road elev. 0 to 7200 ft.-weather-20° to 125° F.
LOCATION Los Angeles-Albuquerque N.M.
FIRM Illinois-California Express Co. L.A.

Hypoid gears in good condition after 332,711 miles!



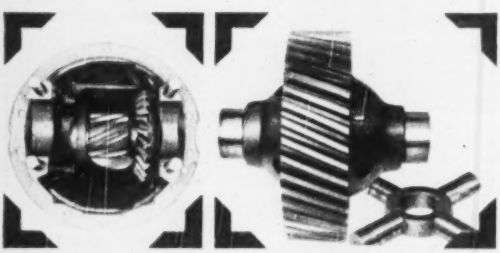
RPM MULTI-SERVICE GEAR LUBRICANT was used exclusively in the final drive from which this hypoid pinion was pulled—459,981 miles since it was new and 332,711 miles since last overhaul. As photo above indicates, none of the gears in the unit was worn enough to warrant replacement.

How RPM Multi-Service Gear Lubricant prevents wear in hypoids

A. Contains a special compound that reacts chemically with metal and forms protective lubricating coating . . . resists rubbing action of hypoid gear teeth.

B. Withstands extreme temperatures and pressures . . . highly oxidation resistant—prevents excessive deposit formation.

C. Provides lubricant for integral bearings and other parts. Will not separate. Inhibitors resist rusting and stop foaming in gear cases.



ALL PARTS OF THE ASSEMBLY WERE PUT BACK IN SERVICE. Note their excellent condition despite 332,711 miles of highway work in extremes of load and weather conditions. The rear end was only taken down because the truck it was in was temporarily tied up in the shop for engine adjustment and service.

REMARKS: This final drive was in a transport unit hauling average gross loads of 68,000 pounds between Los Angeles and Albuquerque, New Mex. Co. The route is through desert and mountains from below sea level to 7200 feet. Some grades rise 2000 feet in 10 miles. Weather temperatures range from sub-zero to 125° F. in this area.

The final drive was in service from 13,000 to 14,000 miles per month. The RPM Multi-Service Gear Lubricant was drained and a new fill put in about every 35,000 miles. RPM Multi-Service Gear Lubricant provides longer gear life in all hypoid sets, truck, passenger cars or other installations. It comes in several grades to meet all conditions.

FOR MORE INFORMATION about this or other petroleum products of any kind, or the name of your nearest distributor handling them, write or call any of the companies listed below.

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THE CALIFORNIA COMPANY • Denver, Colorado

said that it was hoped that most of the capital needed for national projects would be subscribed by private enterprise, with a substantial part of it coming from the United States and Britain. Mr. Casey said: "We are very short of contractors to take on big jobs, and we would welcome overseas companies, particularly if they bring with them their own equipment, key personnel, and their own prefabricated homes for workers."

American engineers who are interested in placing bids for the Big Eildon project should address The Secretary, State Rivers and Water Supply Commission, 100-110 Exhibition Street, Melbourne, C. 1, Victoria, Australia, before June 30, 1950.

Drydock made in England for use on African lake

Parts of a complete 500-ton floating drydock of riveted steel construction have been fabricated in England and shipped out for erection at a new fleet maintenance base of Nyasaland Railways on Lake Nyasa in Africa, according to ENGINEERING, London.

Nyasaland Railways has two ships on the 350-mile long lake—one 450 tons and the other 250 tons—plus seven tugboats and other minor craft.

Completely cut and drilled in England, the dock arrived in sections small enough for convenient transport to be assembled by local labor. Four identical pontoons, fabricated of 0.26-in. steel plate, support sidewalls and give the dock a 160-ft 10-in. length and a 56-ft inside width. Deck, bottom and side plating is 0.26 in. thick.

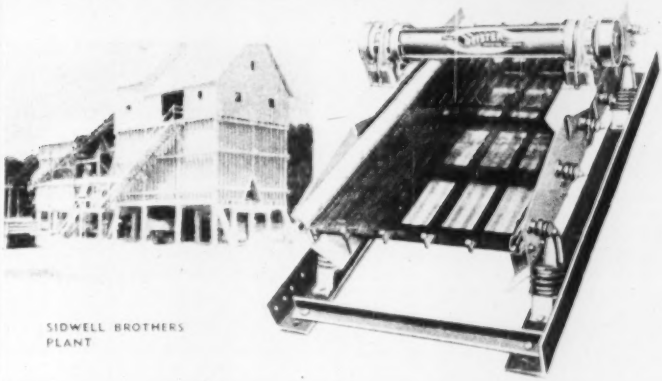
The starboard wall mounts the engine house and controls. A diesel-generator set supplies power—30 kw, 220-v d-c—to a 7-in. centrifugal pump that can discharge about 1,000 gpm against a 12.9-ft head. The dock is said to be able to lift a 450-ton ship with a mean draft of 8 ft in five hours.

Head, Wrightson and Co. built the drydock sections at Teasdale Iron Works, Thornaby-on-Tees. Designers were the late E. H. Stanton of Clark and Standfield, London, and consultants to Nyasaland Railways, Livesey and Henderson, London.

Dutch visitors. To study the latest methods of building construction, in order to help in the rebuilding of their own country, a group of leading construction men from the Netherlands is now on tour in the United States, under the sponsorship of the Economic Cooperation Administration. In various places, the visitors are being assisted by members of the Associated General Contractors of America, the ASCE, and others.

1st

Production report on New Deister Ag-Lime Screen



SIDWELL BROTHERS PLANT

One year ago, we released one of our new Ag-Lime Screens for production tests to Sidwell Brothers, Beavertown, Ohio. It performed so well that a second screen was added later.

Carl Sidwell sums up the exceptional all round performance of the Ag-Lime Screen this way:

"As you know this is a very hard stone to screen. You really helped to solve our problem when you came out with this light weight, steep-incline and high-speed screen. They are doing a very good job."

Both of the revolutionary Ag-Lime Screens at Sidwell are equipped with ¼" square opening cloth and .041" diameter wire. Screen Number One is fed 30 tons an hour, with 10 tons going through. Moisture content is 1½ to 4%. Largest particle in feed is 1 inch.

Ag-Lime Screen Number Two receives 35 tons an hour, with 15 tons going through. Moisture content is ½ to 1½%. Screen cloths last an average of five months.

This is high capacity handling and accurate sizing of damp sticky materials without blinding. The new Deister Ag-Lime is revolutionary: lighter in weight, operates on a far faster stroke cycle—especially designed to handle ag-lime and other damp fines. The experience of Sidwell Brothers is proof enough that for economical screening of agricultural limestone, you can't beat the new Deister Ag-Lime Screen. For particulars, write for Bulletin No. 51 today.

DEISTER SCREENS

DEISTER MACHINE COMPANY

FORT WAYNE 4, INDIANA

Recreation building at Culver, Oregon. Roger Kenny, Bend, Ore., architects. Fred Kasler, Madras, Ore., contractor.

Room for Play ...not much to pay

a story of permanent, clear span construction built for half the usual cost...

How to get a modern building at a genuine bargain was demonstrated in Culver, Oregon, where there was need for a substantial but low cost gymnasium and recreation center for school and community use.

The building shown above is the answer to that need. It is built around five Timber Structures glued Laminated constant radius arches mounted on 12-foot buttresses with poured concrete curtain wall and entrance at each side. End walls are of frame construction.

With purlins to add rigidity, three-inch tongue-and-groove decking is applied directly to the arches. Shower and dressing rooms are in a partial basement. Floor is maple, of spring construction. Roof is mopped-on asphalt; knotty pine interior is natural finish.

Net result is a permanent, distinctive clear span building with 11,500 square feet of usable space which, including excavation, plumbing, wiring, heating and cafeteria kitchen, cost less than $6.00 a square foot!

Timber Structures, Inc., welcomes consultation on similar problems. See the Timber Structures office nearest you, and send coupon for factual booklet, "Timber Members".

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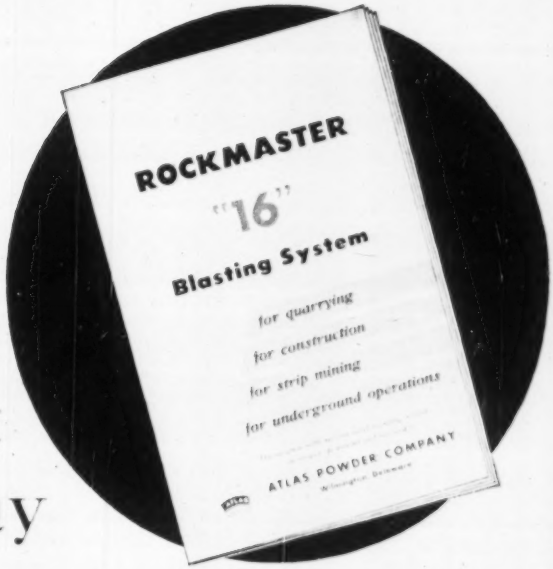
BRUSSELS SUBWAY—A Belgian project begun 40 years ago and interrupted by the devastations of two world wars, has been resumed and is scheduled to be completed next year. It is a train subway system in Brussels. It will connect the North Railway station with the Midi station and there will be four stations on the line. Shown is a portion of the work now being carried on in front of the St. Gudule Cathedral.—Wide World photo.

Foreign Briefs

Progress on Kiewa tunnel—In less than three years, the Kiewa headrace tunnel in Victoria, Australia, has been driven to half of its ultimate length of 12,000 ft. It is part of the No. 4 development of the Kiewa hydroelectric project of the Victoria Electricity Commission, and will convey water from Clover Dam on the East Kiewa River to the pressure rise serving the power station of four 15,000-kw turbogenerators. Over most of its length the tunnel has a sectional area of 200 sq ft.

New Caledonia ore—Rene G. Boyer, traffic representative of the Pan American World Airways, is in this country to stir up interest in the iron ore deposits in New Caledonia in the southwest Pacific. He says there are billions of tons there, the iron percentage averaging better than 50. The ore is at water-edge and on the surface.

University center—The Lord Mayor of London has announced plans for the construction of a university center for commonwealth and United States students in London. It would be a permanent memorial of Britain's gratitude for food gifts from overseas during the war. The estimated cost is $6,200,000.



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This ROCKMASTER "16" booklet includes diagrams of typical loading in quarries, strip pits, mines, and many types of construction. This valuable booklet is free to blasters. Write or phone the nearest Atlas office for your copy *now!*

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design

MAKES ALL THE DIFFERENCE IN WELDING TEES, TOO

When seamless drawn welding tees were introduced some 17 years ago, they represented a great advance over cut-and-welded intersections. Even so, they still had certain inherent weaknesses. Their design was unstable under high internal pressure and failure resulted at the flat spots of the side walls. The relatively weak crotch area, carrying an unequal share of the load, usually gave way first in bursting tests. To compensate, tees were made excessively heavy.

Tube Turns research engineers developed a new welding tee design based on the sphere, nature's strongest form for resistance to internal pressure. This shape, with necessary modifications, became the basis for an entirely new welding tee design.

In the Tube-Turn barrel-type tee, the internal pressure load is carried largely in direct tension. And, in bursting tests involving the old and new design, it proved capable of withstanding 22% more pressure before yielding. It is at least 25% stronger than the code (ASA B16.9) requires, as evidenced by these test results on 6" tees:

Schedule	BURSTING PRESSURE ASA B16.9 Required	Test Minimum
40	4440 psi	5950 psi
80	5845 psi	8625 psi

Result of typical high-static bursting test conducted in the Tube Turns research laboratory. The pipe itself split wide open under the terrific pressure applied. The new Tube Turn welding tee fundamental design, however, held up under it.

FREE BOOKLET

Write for your free copy of Research — a booklet reporting results of exhaustive testing conducted by Tube Turns engineers on the fatigue life of piping assemblies. Well illustrated. Contains valuable information on relative fatigue life of welding elbows, mitre bends, various types of flanges.

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TUBE TURNS, INC.

LOUISVILLE 1, KENTUCKY

MUNICIPAL AFFAIRS

AIR CONDITIONED OFFICES—A pressing need for modern office space in Los Angeles, the most rapidly growing metropolis, is to be partially met by the erection of these three 12-story, fully air conditioned office buildings (with retail shops on a 465 ft frontage) along Wilshire Boulevard from Mariposa Ave. to Irola St., at an estimated cost of $12,000,000. A 2-story garage for 1,400 cars will be built at the rear of the property. Designed by Architect Claude Beelman, the 150-ft high buildings each will cover a plot of 100 x 150 ft. Supervision of construction will be by Tishman Realty & Construction Co., Inc., of New York. General contract has been awarded to C. L. Peck of Los Angeles. The first building is scheduled to be completed by May 1, 1951.

Propose regional plan for eastern Massachusetts

A regional plan for protection of streams, land reclamation and construction of parks, to benefit more than 150,000 residents in the Sudbury, Assabet and Concord River drainage area, has been filed with the Massachusetts Legislature by the Sudbury Valley Commission.

The effect would be to establish flood control and pollution, relieve the mosquito nuisance, drain future farmland, and establish a state park and bird and game preserves. Nine towns most directly affected are: Concord, Wayland, Sudbury, Framingham, Natick, Lincoln, Carlisle, Bedford and Billerica. The proposed improvements extend over the entire drainage basin of 250,000 acres to Hopkinton on the south, west to Northboro, north to Lowell, and east to Lincoln and Weston.

The accompanying bill for flood control would authorize the State Department of Public Works to determine the best way to regulate the high and low water levels of the Concord and Sudbury rivers, by installations at North Billerica and plans for dredging and rock barrier removal.

The towns of Southboro, Ashland, Framingham, Wayland, Sudbury, Lincoln, Concord, Bedford, Billerica and Carlisle would be the location of a mosquito control project.

For the relief of pollution, the commission says that sewage from Framingham and Natick that now empties into the Sudbury River can be diverted to the south metropolitan sewer.

GSA grants planning loans

Loans totaling $555,000 for preparing plans on four projects estimated to cost $12,740,000 have been cleared by Jess Larson, General Services Administrator.

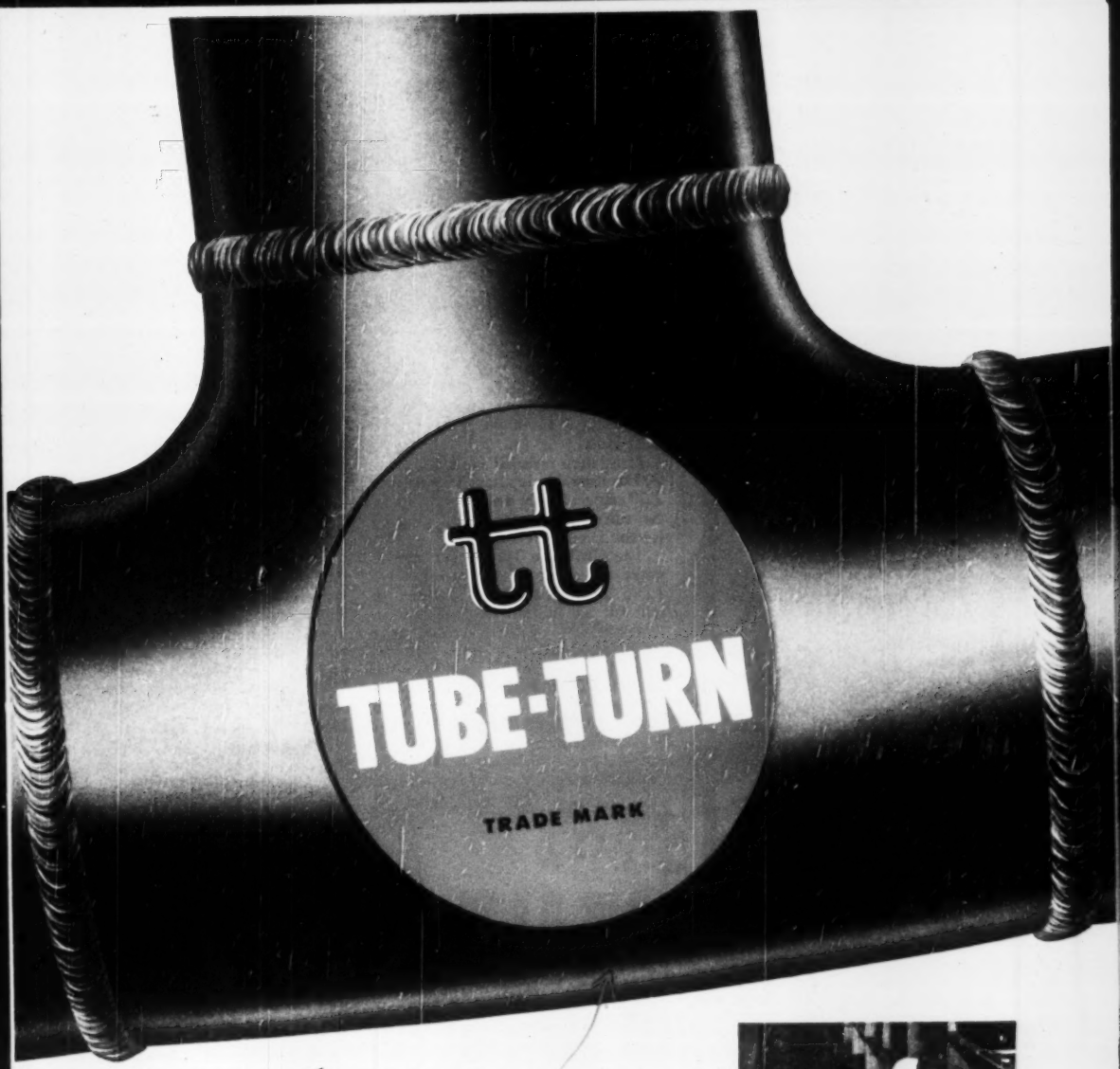
Loans totaling $245,000 were approved for two projects of the Bergen County, N. J., Sewer Authority, to finance plan preparation of a sanitary sewer system that will serve nine separate communities. Estimated construction cost is $7,925,000. (ENR Oct. 26 '50, p 18.)

Another loan of $110,000 was approved for plan preparation of a 9-story annex to the Milwaukee, Wis., city hall. This project—10 percent of it to be allotted for a health center—is estimated to cost $3,750,500.

A loan of $30,000 also was approved for the sanitary district of Decatur, Ill., for plan preparation of additional sewage facilities to cost $1,059,000.

These loans were made under the second advance planning program cited last fall. (ENR Oct. 26 '50, p 23.)

Continued on page 58



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Full technical details on Copperized CZC available for the asking. Write E. I. du Pont de Nemours & Co. (Inc.), Grasselli Chemicals Dept., Wilmington 98, Delaware.

DU PONT

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

There's a building boom in New Orleans, La.

For a place that revels in antiquity, New Orleans may be losing its reputation as a building boom that will soon attract wide attention.

Sparked by the clearing of slums and the filling in of an old canal to provide a site for a new union railroad station, the boom will be in full swing by mid-summer. Here's what happened in a recent week:

The first piles were driven for the $10,000,000 Claiborne Towers—a 17-story apartment building, the tallest in the city.

A bid-opening was announced for an 18-story, 400-room wing to the Jung Hotel.

Plans were revealed for a $30,000,000 housing development to consist of 2,600 single-family dwellings, the largest such development ever planned for the Crescent City.

The Claiborne Towers project will cover an entire block and contain 1,056 apartments, most of them to rent for $70 monthly. Shelby Construction Co., builders, reports that Raymond Concrete Pile Co. will use about 1,700 concrete piles 80 ft long. Jones & McLaughlin Steel Co. has the contract for fabrication and erection of the structural steel. Claiborne Towers, Inc., is owner and operator of the building, which was financed under Section 207 of the Housing Act.

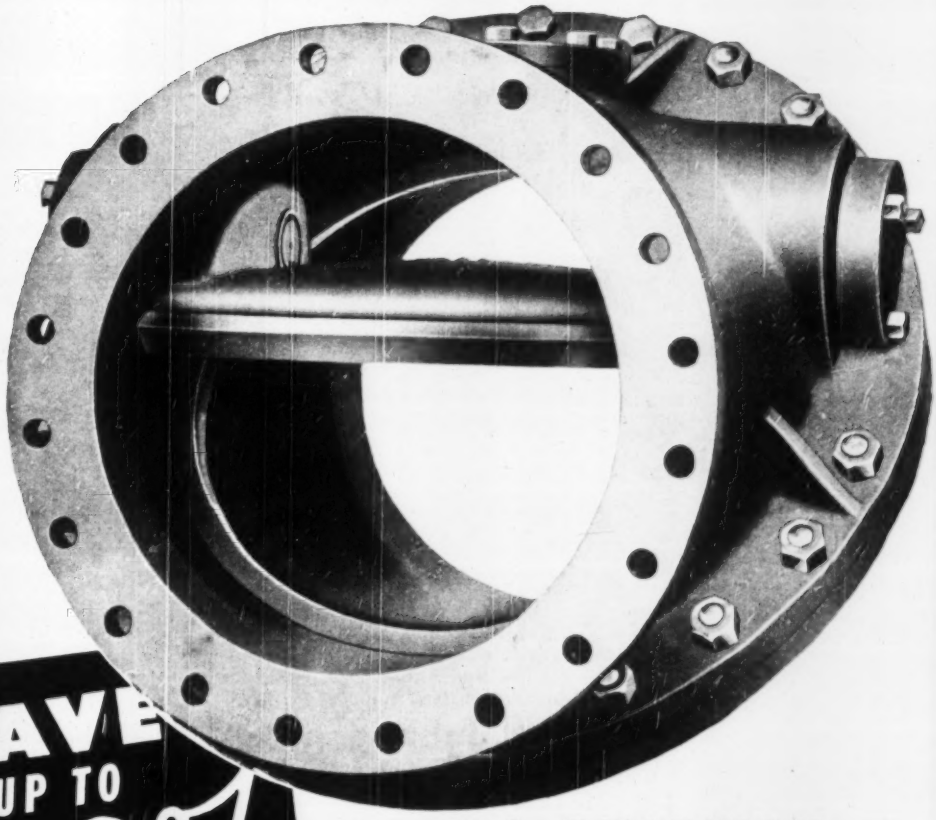
Nowland, Van Powell, Memphis, Tenn., and Henry Weinreich, New Orleans, are the architects.

There is good background for this somewhat unexpected sudden interest of a single week. Building permits for the first three months of this year have been so high that it is even predicted that the total will be 1950 will double 1949's high record.

In addition to Claiborne Towers, eleven other multi-story apartments will be pushing skyward by July. Seven are already under construction, providing the city with its first new tall buildings since 1930. New Orleans is transforming its skyline at the same time that it is modernizing its front yard.

Chicago subways—Plans are being studied in Chicago for a $2,000,000 bond issue to finish the West and Northwest subway extensions. The 20-year bonds would be paid off by subway rentals from the Chicago Transit Authority. The bond issue is needed because CTA failed to pay the city compensation for the use of streets in 1949, according to Virgil E. Gaulock, commissioner of subways and superhighways. In 1948 CTA paid the city $1,055,000 in such compensation, but last year the revenues were insufficient. Plans to finance the subway extensions with a $25,000,000 bond issue, to be paid off with street use compensations, were abandoned in July, 1948.

MIAMI'S NEW STADIUM—His new $1,500,000 stadium, home of the Miami Sun Sox, is located at N. W. 10th Ave. and N. W. 23rd St., Miami, Fla. It is of concrete and steel construction with a cantilever roof so that no posts obstruct the view from any seat. The lighting system consists of 8 steel towers 140 ft high with a total of 612 reflectors. The seating capacity is: Permanent, 9,500; bleachers and temporary, 7,500. The designer was William Holman of Nashville, Tenn., and the contractor, Taylor Construction Co., Miami.—(Wide World Photo)



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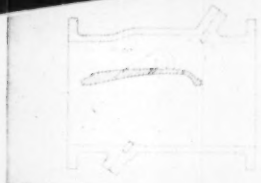
That's right! With Chapman Tilting-Disc Valves, head losses are 65% to 80% lower than for conventional type check valves.

But no wonder head losses are lower. Chapman Check Valves work with . . . not against . . . the stream. The balanced disc rides smoothly on the flow . . . lifts away easily in opening and closes quickly and quietly. There's no slamming to cause destructive pipe line stresses . . . minimum wear on seats, hinge pins and bearings.

All these features mean lower maintenance costs for you. So write *today* for additional information.



Cross-section of the Chapman Tilting Disc Check Valve illustrating the way that the balanced disc is supported on the pivot, with arrows showing the travel of the disc. A feature of the design is that the disc seat lifts away from the body seat when opening, and drops into contact when closing, with no sliding or wearing of the seats.

The Chapman Valve Mfg. Co.
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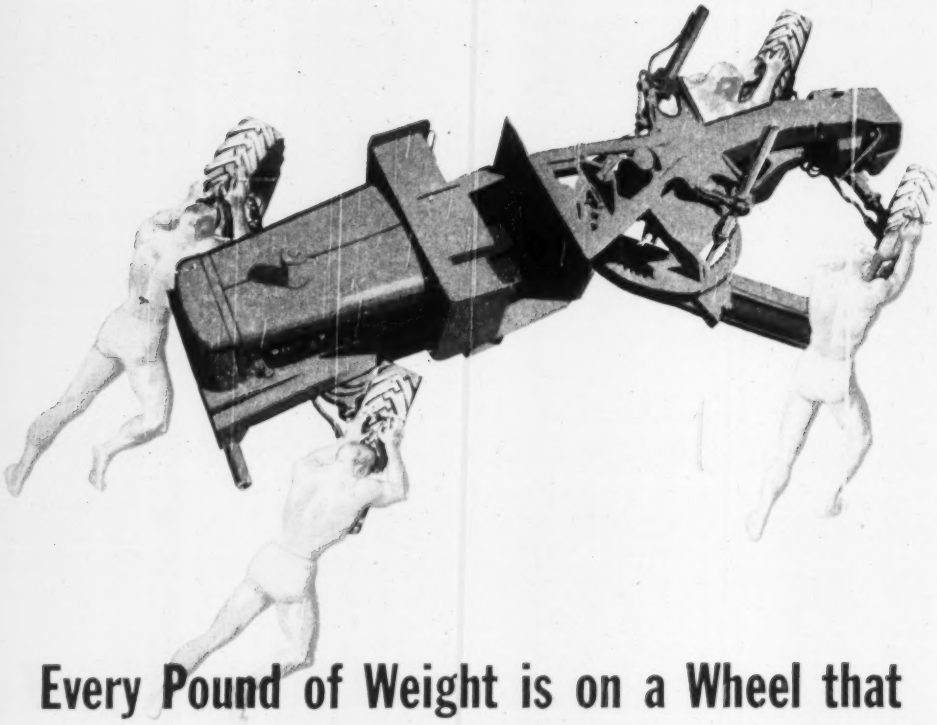

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EDUCATION and RESEARCH

Finlayson to retire

J. N. Finlayson, dean of the faculty of applied science at the University of British Columbia at Vancouver, will retire July 1.

Dean Finlayson went to UBC in 1930 from the University of Manitoba and has since guided the university's engineering faculty. He is being awarded an honorary degree of doctor of science. His career has combined business and academic activities, ranging from bridge construction to private consulting practice, professorships in three universities and chairmanship of arbitration proceedings in connection with development of hydroelectric power for Halifax, N. S.

From 1910 to 1913, he was employed as bridge designer for the Canadian Northern Railways, erecting 10 bridges between Vancouver and Kamloops. Later he joined the staff of Dalhousie University as professor of civil engineering while continuing practice as consulting engineer. In 1919 he was appointed chairman of the federal land drainage board, and the same year founded a professorship at the University of Manitoba.

Pipeline network analyzer saves time and effort

An ingenius computer for taking the guesswork out of municipal water and gas systems and other networks of pipelines or ducts has been developed at Cornell University by Prof. Malcolm S. McIlroy, who describes its function in the "Cornell Engineer" and the "Journal" of the American Water Works Association.

The device, called a "pipeline network analyzer," offers an electrical short cut to specifications usually obtained by time consuming calculation. The principle behind the analyzer is the analogy between fluids and their electrical counterparts, fluid flow being represented by electric current. Pressure loss in a pipeline is represented by voltage drop in a special type of resistor.

Simple controls permit pressures and rates of flow to be represented by proportional electrical quantities. The results are recorded on instrument scales indicating gallons per minute, feet of water, or other units.

Each pipline is simulated by a special type of resistor called a "fluister," consisting of a tungsten filament enclosed in an evacuated glass tube. Heavily loaded pipelines are indicated by bright fluistor filaments, underloaded lines by filaments that do not glow.

The efficiency of the device has been demonstrated in actual studies of the water-distribution system on the Cornell campus and in the City of Winnipeg, Man. In one day, 14 studies of the Cornell system were conducted. By old methods, the work would have required two or three weeks.

The analyzer may be used for studies of flow of low-pressure gas in pipeline networks, and in problems involving compressible fluids, such as dry steam and high pressure natural gas, as well as for studies of duct systems in ventilation and air conditioning.

N. W. engineering research

A comprehensive survey of engineering research activities in the Pacific Northwest will be provided by the conferences of the Engineering College Research Council during the 1950 annual convention of the American Society for Engineering Education at the University of Washington, Seattle, June 19-20.

Three sessions will be devoted to the federal and industrial research activities of the region and the relation of these to the area's educational institutions.

Speakers will include S. E. Schultz, chief engineer for Bonneville Power Administration; Samuel J. Hutchinson, assistant regional director of the Fish and Wild Life Service; Don Walters, director of the Inland Empire Research Council; H. K. Benson, director of Research for the Lands Co.; W. W. Moyer, director of research at Crown Zellerbach Corp.

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Don Redfern, technical director of American Marietta Corp., S. E. Middigan, director of the British Columbia Research Council; and Donald W. Finlay of the Seattle division, Boeing Airplane Co.

Principal speaker at the annual dinner of the council group will be Gerald A. Rosselot, director of the State Engineering Experiment Station at the Georgia Institute of Technology.

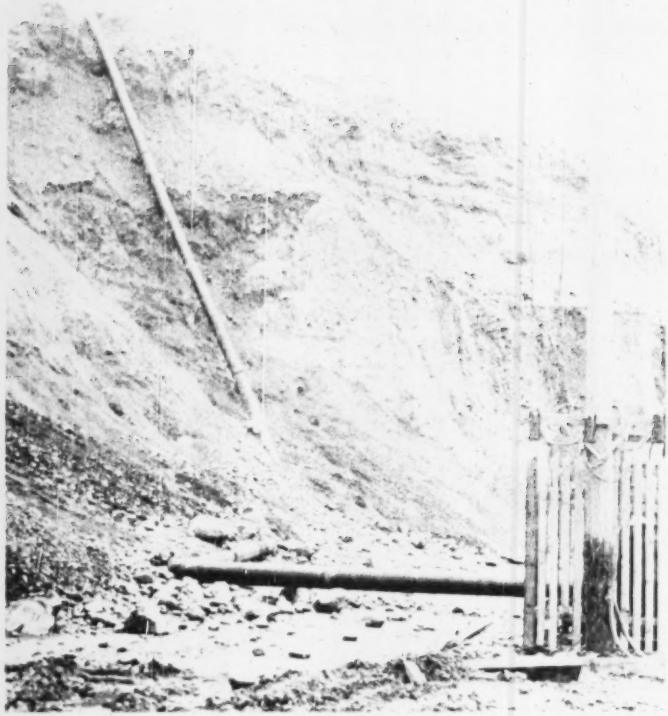
Educational Notes

Advanced structural theory—A graduate course in advanced structural theory is being offered by the Pennsylvania State College at its Harrisburg center. It is given for practicing engineers in that area. Instructor is J. F. Liebsch, bridge engineer of the Philadelphia Department of Public Works, who is planning the course around practical design techniques employed on the Pennsylvania Turnpike bridges.

Waterworks operators' school—The North Carolina Water Works Operators' School will be conducted in Chapel Hill June 4-9. Sponsored by the North Carolina Water Works Operators' Association with the North Carolina Section of the American Water Works Association, the school will be conducted by the Institute of Government in cooperation with the School of Public Health of the University of North Carolina. The school will be open to residents of neighboring states also.

Materials shrinkage—Federal Housing & Home Finance Agency has awarded a $10,000 contract to the Research Foundation of the University of Toledo, Ohio, to carry out research on shrinkage of building materials. Results will be published by the government for use of the construction industry and the public. The work will be done by members of the foundation and faculty, under supervision of John K. Sheldon, coordinator of housing research, and John B. Brandeberry, dean of the college of engineering.

Summer session—Chester A. Arents, assistant dean of engineering, has been named director of the 9 week summer session of the Illinois Institute of Technology, June 15-Aug. 18. More than 135 undergraduate courses for both undergraduate and graduate students will be offered in 17 fields of study in engineering, design, the natural sciences, and certain areas of the social sciences and humanities. Thirty-two courses in 12 fields will be offered for graduate students only.



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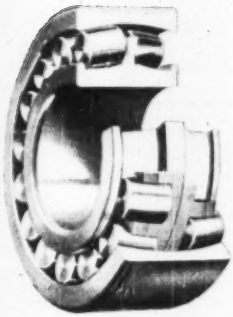

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The Marion Type 43-M excavator is designed for all-purpose work—as a one cubic-yard shovel, clamshell, dragline, backhoe, crane or pile driver. It's also designed to swing easily under load, with Torrington Spherical Roller Bearings on the center journal.

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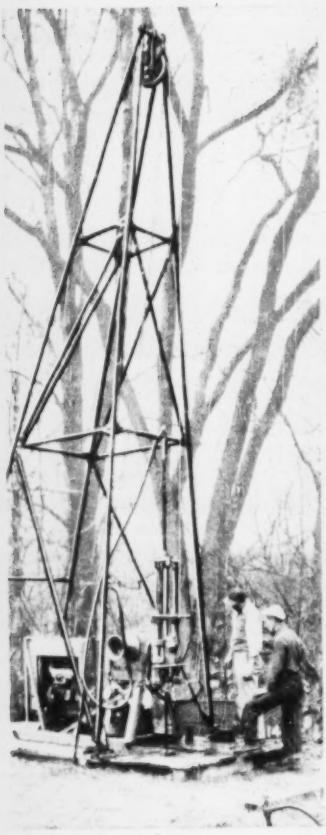
We call our new core drill the "Teredo" because it will out-bore any other machine of its size. This light, compact, portable core drill will recover cores up to 2⅞" in diameter and operate at depths to 600'. It can be mounted on drag skids, jeep, truck or trailer; and powered by air motor, electric motor, gasoline or diesel engine or truck take-off. It's simple, rugged and relatively inexpensive. Either mechanical screw feed or hydraulic feed can be furnished. Send for Bulletin 30.



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MEN AND JOBS

Harry Keefe, graduate of the Notre Dame school of engineering, succeeds **John J. Mahoney** as building commissioner of Boston, Mass. He is a veteran and has been with the Thomas Worcester Co., engineering consultants, Boston.

Pennsylvania's Department of Health has announced the appointment of **John H. Gilliland**, of Meadville, Pa., as a junior sanitary engineer.

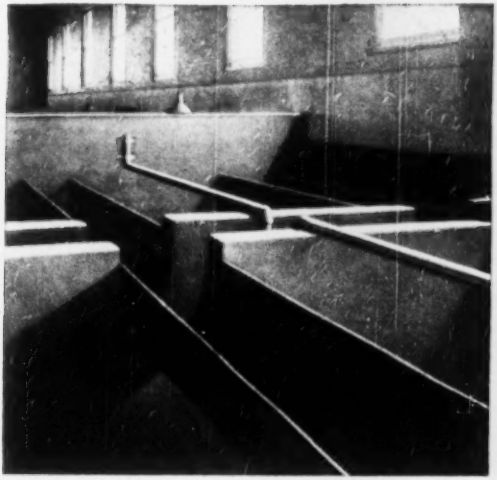
R. J. McMullin is the new manager of the Salt River Valley Water Users Association, Phoenix, Arizona. He moved up from superintendent of irrigation to fill a vacancy caused by the resignation of **O. L. Norman** as general manager. A graduate of the University of California, he has been with the Water Users Assoc. since 1948. He served with the armed forces. Before entering the service he was with

(Continued on page 67)

Prior to the beginning of the West Virginia highway construction season, a panel of state contractors and road commission engineers met to discuss ways and means of eliminating any prospective bottlenecks before actual work is started. Pictured above at the meetings are, front row, left to right: George W. McAlpin, state construction engineer; P. J. Walsh, executive secretary, W. Va., Contractors' Association; John C. Cobb, district engineer, U. S. Public Roads Administration. At the rear, left to right, Harry Radcliffe, administrative assistant, engineering, State Road Commission, and Leo Vecellio, president of the contractors.

Emergency construction of a 2,245-ft. tunnel to supply water to part of the Grand Valley reclamation project was launched through the contract signing shown here. Inking the document is L. N. McClellan, chief engineer of the Bureau of Reclamation. Flanking him are Floyd Shoemer, president of the Rhodes-Shoemer Construction Co., left, and Everett Seabury, vice-president, Grate-Callahan Construction Co. Standing, left to right, are W. L. Bloomgren, assistant chief engineer, W. H. Nadler, chief designing engineer, and Grant Bloodgood, chief construction engineer, all of the Bureau. The contract award followed by seven days the collapse of a tunnel of the old western Colorado project on March 9.—ENR March 30, page 22.—Bureau of Reclamation photo.

West Pumping Station and Filtration Plant, Bureau of Water, Erie, Pa.



Water plant filter beds metallized with zinc to stop rust and corrosion.

Metallizing Checks Corrosion

at Bureau of Water, Erie, Pa.

Used As Far Back As 1930 To Protect Steel Surfaces Against Corrosion.

The Bureau of Water, Erie, Pa., started to use metallizing in 1930, when they sprayed zinc on all bolts and nuts used in the construction of a 72" dia. 8800 ft. intake. In 1932 a new filtration plant was placed in operation, but in only 18 months heavy corrosion was noted on the 110,000 gallon wash water tank interior. So they metallized the 32 ft. dia. x 19 ft. deep tank with .006" pure zinc. After six years no rusting had occurred, even though the tank interior is intermittently exposed to water and air.

Saved—Repair Costs and Nine Weeks' "Down" Time—Superintendent states that with ordinary methods of protection there would have been three periods of suspended service for the tank, each of them lasting for at least three weeks. "Now, however," he points out, "with no indications of a breakdown of the zinc coating, which has been in continuous operation for six years, we feel assured that the metallized surfaces will give many more years of perfect protection."

Other Jobs—This same user reports that metallizing has stopped corrosion on a number of other jobs done since the tank described above. These include steel filter troughs—some of which had already become so badly corroded that small holes had penetrated through the metal. These holes were filled with the sprayed metal at the time the coating was applied, thereby restoring to use troughs which otherwise would be considered worn out. They've also used metallizing to stop corrosion in boiler plant feed-water treating tanks, on steel ladders in basins and reservoirs, brace rods, sluice gates and, as user states, "all metal surfaces subject to rapid oxidation."

Further Information Available—Metallizing may help solve your corrosion problems. For further information, or the name of your nearest metallizing contractor, write

FREE BULLETIN. Bulletin 62—Stop Corrosion with Metallizing—pictures many different types of jobs, such as bridges, structural steel, barges, dam gates; includes spray cost and life expectancy charts.

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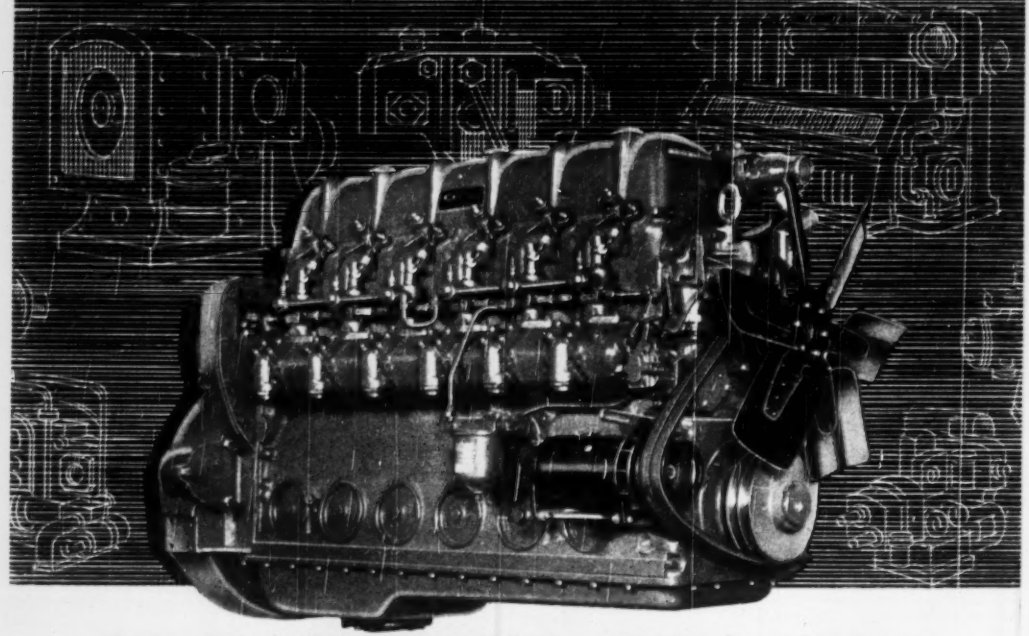

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the California Edison Company.

Carl J. Bernhardt, district sanitary engineer of the New York State Health Department in Jamestown for 12 years, has been named regional sanitary engineer in the Buffalo area, succeeding **Ralph D. Bates**, transferred to Albany to become chief of the sewage and waste section of the Bureau of Environmental Sanitation.

P. F. Greenwood retired recently as chief inspecting engineer of the Panama Canal after 37 years of government service.

M. D. Stewart, city engineer of Sudbury, Ont., has resigned.

S. C. Austin has been named assistant executive secretary of the Carolinas Branch, AGC. He will be in charge of the highway and heavy contractors' divisions. He is a graduate in civil engineering, University of North Carolina, 1921. He has resigned as equipment engineer of the Highway Commission to join the AGC.

First Lt. William P. Gardiner has replaced **Capt. J. T. Wren** as executive officer of the Little Rock, Ark., district of Army Corps of Engineers. Captain Wren has been ordered to Japan. Gardiner is a West Pointer.

Wilfred Sykes, chairman of the board of Inland Steel Co., has been appointed a member of the Chicago Housing Authority by Mayor Martin Kennelly for a 5-year term. He was this year's winner of the Washington Award for outstanding performance in engineering.

Stanley E. Sporseen, civil engineer with the Portland, Ore., district, Corps of Engineers, has been loaned to the Venezuelan government for one year to assist in planning hydroelectric and irrigation dams. He has been with the corps for 15 years. When his mission is finished he will return to his Portland position.

Joseph M. Dearborn, Bridgeport, Conn., has been named city planning engineer to succeed **Robert H. Canfield** who retires because of ill health after 12 years. Mr. Dearborn, geodetic engineer in the city engineer's department, has been consultant to the City Planning Commission for two and one-half years.

Grady E. Lee, a civil engineer in the city planning commission of Atlanta, Ga., has resigned to become a project planner for the U. S. Public Housing Administration.

Roger D. Lee has been appointed hydraulic engineer of the Western Massachusetts Electric Co., at Turners Falls, succeeding Herbert A. Moody, retired. He is a New York University graduate formerly with the U. S. Engineer Offices in flood control and during the late war in airfield drainage design. He also worked for the New York City Board of Water Supply on hydraulic model studies and in heavy construction. He joined Western Massachusetts in 1946 as assistant to Mr. Moody.

Marvin R. Springer, head of Harland Bartholomew & Associates of St. Louis, Mo., city planning firm, has been made city plan engineer of Dallas, Tex., succeeding **E. A. Wood**, made head of a new zoning enforcement department in Dallas. Springer was educated at Iowa State College and has supervised the preparation of master plans for many cities, including Dallas; Schenectady, N. Y.; Topeka, Kan.; and Battle Creek, Mich.

John C. Walker, division engineer of the eighth division of the North Carolina State Highway & Public Works Commission, at North Wilkesboro, has resigned to become city manager of Asheville, N. C. He has been with the commission for 25 years and was formerly division engineer of the tenth division, at Asheville, N. C.

Following the completion of the contract of **E. O. Mills** as consultant of the Toledo-Lucas County Plan Commissions, the city group has reorganized its staff, with **Ellick Maslan**, plan commission director, who had offered his resignation to take a position with Chicago housing authorities, being asked to remain with the Toledo plan bodies. The city group voted to put Mr. Maslan in complete charge of the staff, authority heretofore having been

HANDBOOK OF RIGGING

1. Condensed into this one book are all the tips, methods and techniques essential to more effective rigging practices in industrial and construction operations. Deals with everyday maintenance operations with the transportation and handling of heavy machinery with the erection and demolition of smaller size structures. Covers everything from ropes, hoisting chains and hooks to slings and ladders. By W. E. Rossnagel, Safety Engr. 328 pages, $4.75.

THE BUSINESS OF HOME BUILDING

2. Explains business methods that make home building more profitable. Gives the business "know-how" needed to make a profit with minimum risk. By G. R. Johnstone, Carnegie Institute of Technology, and C. E. Joern, Wm. Joern and Sons. 289 pages, 5 1/2x8, $3.00.

SURVEYING
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3. A handy guide to precision in small-area surveying in the field and shop. Whether you are aligning machinery, planning construction, setting a tag or making a map, it shows you the most accurate and rapid methods of surveying the job. Describes every thing of importance from the care and use of instruments and equipment, to practical techniques, settling fine details of specific problems. By P. Kissam, Princeton U. 364 pages, 6 x 9, $5.50.

PLAIN CONCRETE

4. This new third edition brings you modern methods in producing and using concrete. Every important phase of concrete technology preparing specifications, supervising construction, and testing concrete, and concrete materials is fully covered. Includes best practice in proportioning, mixing, placing, finishing and curing concrete. By E. S. Bauer, U. of Illinois. 341 pages, 6 x 9, $5.00.

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Available in diameters up to 600 feet, this new design eliminates the need for any internal supporting columns. Its light weight effects considerable saving in foundation costs and erection is simple and rapid. It can be embodied in rectangular or other layouts, and is competitive in cost with other construction methods. The roof cannot spark, and is therefore ideal for oil storage tanks. A complete 80 ft diameter roof can be carried on one five ton truck.

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divided between the director's post and the chief planner, Lloyd Keefe.

O. L. Norman, manager of the Salt River Valley Water Users Association at Phoenix, Ariz., since 1947, has resigned, effective June 1. During Norman's tenure as general manager the association instigated a vigorous reconstruction and improvement program to conserve water and improve electrical distribution.

John C. Page, retired commissioner of the Bureau of Reclamation has received the Department of Interior's highest honor, the Distinguished Service Award. He was commissioner from 1937 to 1948, and a bureau consulting engineer until 1947. The earlier part of his 36 years of bureau service were spent on the Grand Valley and Boulder Canyon projects.

Ivar Van Akkeren, a graduate of the University of Wisconsin is city engineer of Beaver Dam, Wis.

Robert F. Coleman, Jr., assistant city engineer at Wilmington, N. C., since 1947, has been named acting city engineer, succeeding **Henry M. von Oesen,** resigned to enter private business, and Ward Andrews, of the City Engineering Department staff, has been named assistant city engineer. Coleman holds a B.S. in civil engineering, a B.S. in sanitary engineering, and a M.S. in sanitary engineering from North Carolina State College, where he was an instructor in materials testing and surveying from 1940 to 1942. He served in the Navy from July, 1942, to February, 1946, while he took a course in naval architecture at Massachusetts Institute of Technology and he served for three years as assistant design superintendent at the Naval Shipyard at Brooklyn.

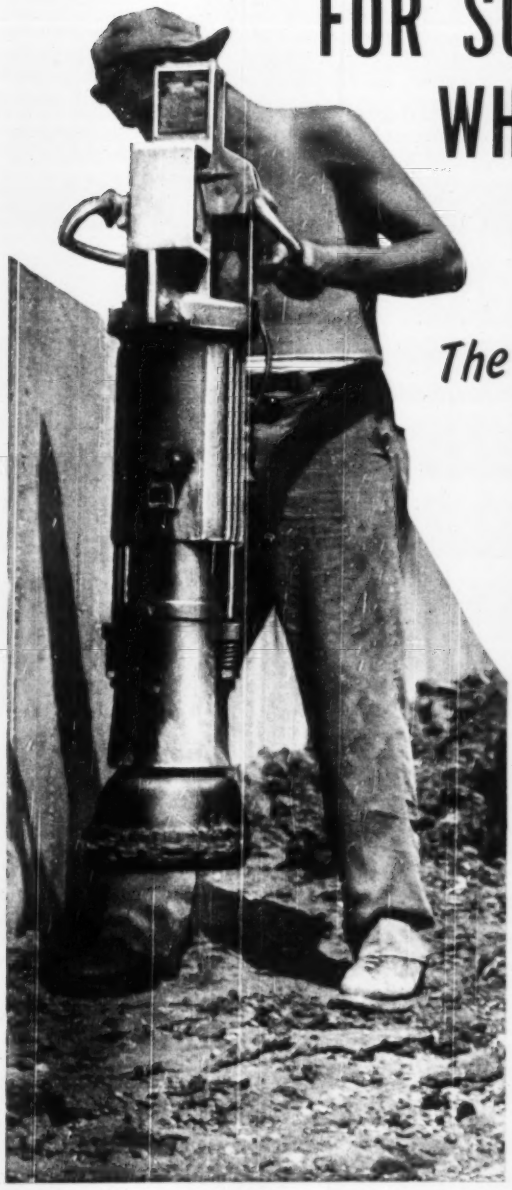
Benjamin Schwartz, civil engineer with the New York State Department of Public Works, has been appointed director of public works of Jamestown, N. Y., succeeding **Charles J. Strandburg,** retired. **Lawrence A. Fletcher,** who has been serving as acting director of the department, will continue as assistant director under Mr. Schwartz.

Jerome H. Fertig, Bureau of Reclamation engineer and chief of the development office on the Cachuma Dam project, Santa Barbara, Calif., has been awarded an Interior Department citation for meritorious service for his investigation and planning of the $30,000,000 Cachuma project. He is a veteran of 29 years bureau service.

(Continued on page 71)

FOR SOIL COMPACTION WHERE ROLLERS *CAN'T GO!*

The Barco Pegson Rammer



This self-contained, portable rammer is specially adaptable to tamping close to abutments and other wall structures, in narrow ditches and trenches, thus eliminating troublesome settlement areas. Actual field tests, certified by Government agencies, have proved that one man using the Barco can do *the work of five* who use conventional equipment! This economical machine is easy to operate—no lifting, no strain, no vibration. A slight tilt on the handle will "walk" the Barco wherever you want it to go. Don't tie up your funds in heavy equipment—order Barco today. Write for free demonstration or catalog to Barco Manufacturing Co., 1814F Winnemac Avenue, Chicago 40, Ill.

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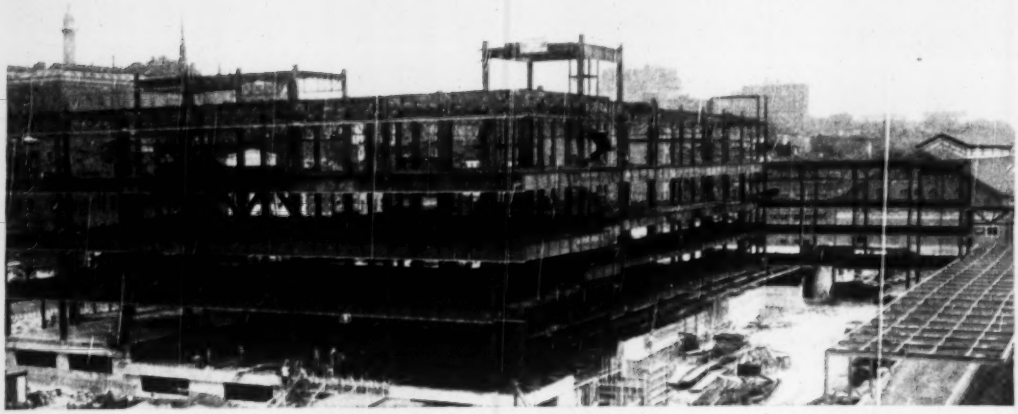

Fig. 1. Framework partially complete for the printing plant of Baltimore Sun, Baltimore, Md.
Architects: Palmer, Lyster, Williams and Nes.
Consulting Engineer: Van Rensselaer P. Saxe. General Contractor: George A. Fuller Co.

By VAN RENSSELAER P. SAXE
Consulting Engineer
Baltimore, Md.

A SAVING of $68,522 has resulted from the adoption of welded design for the publishing plant of the Baltimore Sun and Evening Sun shown in Fig. 1. Structural weight was cut by over 7%. A sizable amount of money was saved also on concrete and form work, as well as on reduced building height made possible by continuous beam design involving shallower structural members.

Typical framework connections illustrating the simple details for field erection are shown in Figures 2—5. Beams are positioned on erection seats or clips and then field-welded with Lincoln's "Fleetweld 5" electrodes using 400 ampere Lincoln "Shield-Arc" motor driven arc welders. In the design of frame members, bevel cuts for connections were so planned as to make maximum use of fast, easy downhand welding.

The quotation of the low bidder for riveted construction was $551,508. The actual cost of the welded frame was $482,986. This accounted for the $68,522 saving in the structure.

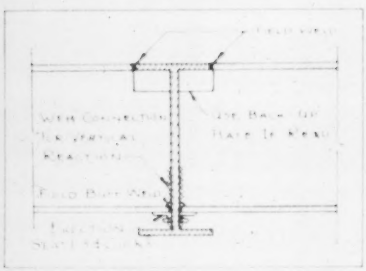

Fig. 2. Typical beam to girder connection.

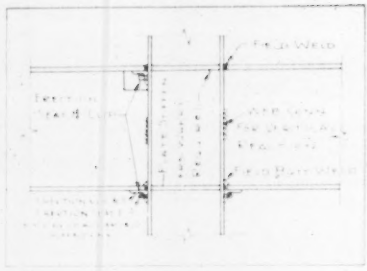

Fig. 3. Typical beam to column connection.

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World's largest caisson, for west anchorage of Delaware River Bridge at Wilmington, Del., provides a platform for these two bridge building experts. Homer Seely is resident engineer for Howard, Needles, Tammen & Bergendoff, consulting engineers on the work, and William Denny is superintendent for Merritt-Chapman & Scott Corp., the foundation contractor.

Ivan A. Bickelhaupt, captain, civil engineering Corps, U. S. Navy, now on inactive status, has joined John W. Hurts Associates, Inc., builders, of New York and Chicago, as Washington representative. Prior to his return to civilian life in 1946, Captain Bickelhaupt was public works officer in charge of construction for the Fifth Naval District. In May, 1943, he was sent to the British Isles to construct a naval seaplane base in Northern Ireland. Later he spent 15 months as engineering and construction officer on the staff of the Alaskan Sector Commander in charge of all naval construction in that area. He also directed construction of the Marine Corps base at Cherry Point, N. C.

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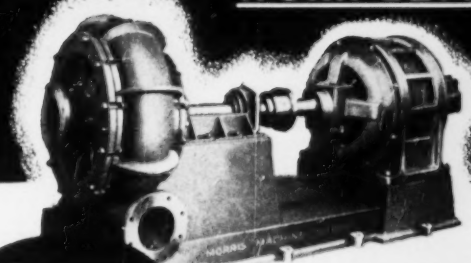

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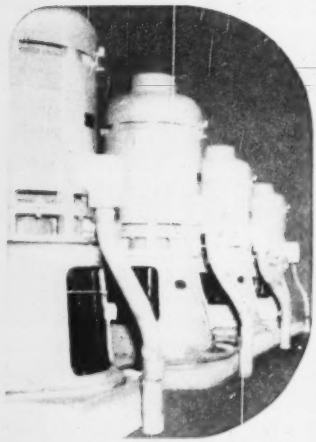

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ELECTIONS AND ACTIVITIES

James R. Price, Lafayette, Ind., president of National Homes Corp., has been elected president of the Prefabricated Home Manufacturers Institute, succeeding Hart Anderson, Minneapolis, vice president of Page & Hill Homes, Inc.

Guy Martin, of Albuquerque, has been elected president of the New Mexico Society of Professional Engineers. Charles E. Barnhart, of Albuquerque, was elected first vice president, and Lawrence D. Wilson, Santa Fe, second vice president. T. L. Castonguay, of the University of New Mexico engineering department, was re-elected secretary-treasurer.

Vlon Skinner, Sr., has been elected president of the Durham, N. C., Engineers Club, succeeding P. D. Davis. Other officers are: M. A. Ham, vice president, and Guy H. Bennett, secretary-treasurer.

Lawrence Merchants of Asheville has been elected president of the Engineers Club of Western North Carolina, succeeding E. O. Bryant. Other officers: V. M. Maclary, vice president; M. C. Teague, secretary; E. W. Milligan, treasurer, and Clyde R. Hoey, Jr., and Lawrence Hart, directors.

W. R. Gelston, superintendent of waterworks, Quincy, Ill., has been elected chairman of the Illinois Section of the American Water Works Association, succeeding J. C. Monahan, manager, Northern Illinois Water Co. J. L. Hart, succeeds C. N. Brown as secretary-treasurer. Both are with the U. S. Pipe & Foundry Co. E. F. Alt, Chicago Bridge & Iron Co., was elected vice-chairman, and H. E. Hudson, Illinois State Water Survey, was named trustee of the association. Louis L. Birdsall, technical service engineer, General Chemical Co., received the Fuller Award for outstanding contribution to the waterworks industry.

Elmer F. Stuckey, Fort Wayne, assistant district engineer of traffic for the Indiana State Highway Department, has been elected president of the Traffic Engineers Association.

The Georgia branch of AGC has opened its new two-story building at 167 Harris St., N. W., in Atlanta. The branch was chartered by 18 companies in March, 1928, and has grown to 85 member firms. Ray M. Lee is president and Hugh W. Roberts is executive secretary. The new building was designed by Stevens & Wilkinson and constructed by Strother-Burge Co.

The Florida Engineering Society has elected E. A. Nordstrom of St. Petersburg president to succeed A. P. Michaels of Orlando. Other officers are: W. H. Beisler, Gainesville, vice president; David B. Lee, Jacksonville, second vice president; John B. Miller, Jacksonville, secretary, and Raymond Clerse, Jacksonville, treasurer.

Ohio Sand and Gravel Association has elected C. W. Purdy, Killbuck, as president; C. R. Fuller, Portsmouth, vice president; James H. Evans, Columbus, treasurer; and Claude E. Clark, Columbus, executive secretary.

Cigarette tax for sewers—Mayor Hixon of Tampa, Fla., says that money coming back to the city from the state cigarette tax will be used immediately for two badly needed storm drainage projects. Tampa now has some $190,000 in reserve as its share of the tax that went into effect last September. Cost of the two sewer projects is estimated at $186,000.

MAJOR MEETINGS

Producers' Council, spring meeting, Washington, D. C., May 9-10.

Highway Conference, University of Florida, Gainesville, May 11-12.

U. S. Conference of Mayors, Waldorf-Astoria Hotel, New York City, May 11-12.

Florida Highway Conference, University of Florida, Gainesville, Fla., May 11-12.

American Water Works Association, Pacific N. W. Conv., Hotel Wm. Hirop, Tacoma, Wash., May 11-12.

National Citizens Conference on Planning, Statler Hotel, Washington, D. C., May 12-13.

American Water Work Associations, spring conference, Penn-Sheraton Hotel, Philadelphia, Pa., May 21-26.

Society for Experimental Stress Analysis, spring meeting, Hotel Statler, Cleveland, Ohio, May 25-27.

Building Officials Conference of America, Indianapolis, Ind., June 4-8.

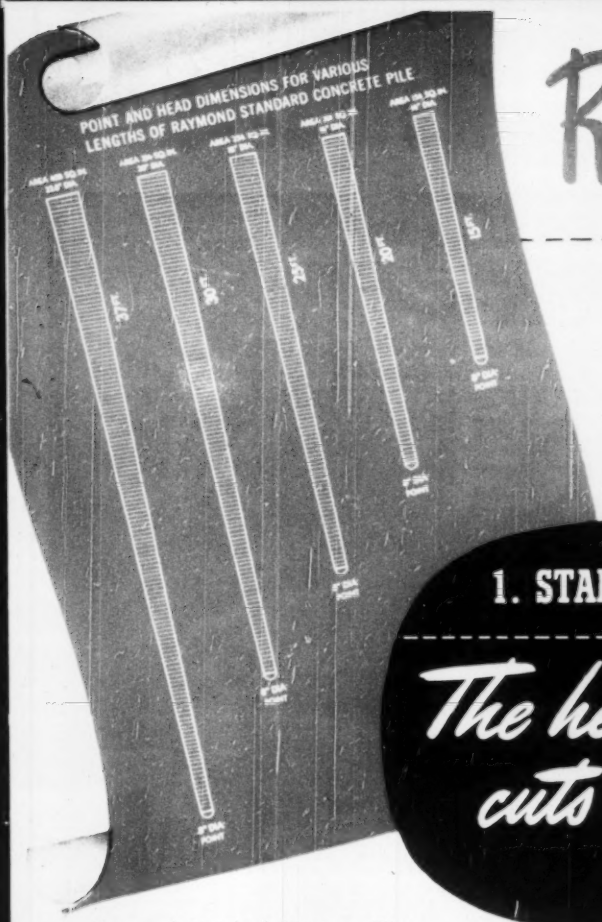
National Society of Professional Engineers, annual meeting, Hotel Statler, Boston, Mass., June 8-10.

Central States Sewage Works Association, Hotel Jayhawk, Topeka, Kan., June 12-13.

Western Association of State Highway Officials, Mapes Hotel, Reno, Nev., June 12-15.

Pennsylvania Sewage Works School, [illegible], June 19-21.

Pennsylvania Water Works School, [illegible], June [illegible].



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3. PIPE STEP-TAPER
4. COMPOSITE
5. GOW CAISSONS

Raymond installs every type of pile: cast-in-place concrete, precast concrete, steel pipe, wood and H-beam. Raymond operations include underpinning, borings and soil investigations, waterfront construction and harbor and river improvements.

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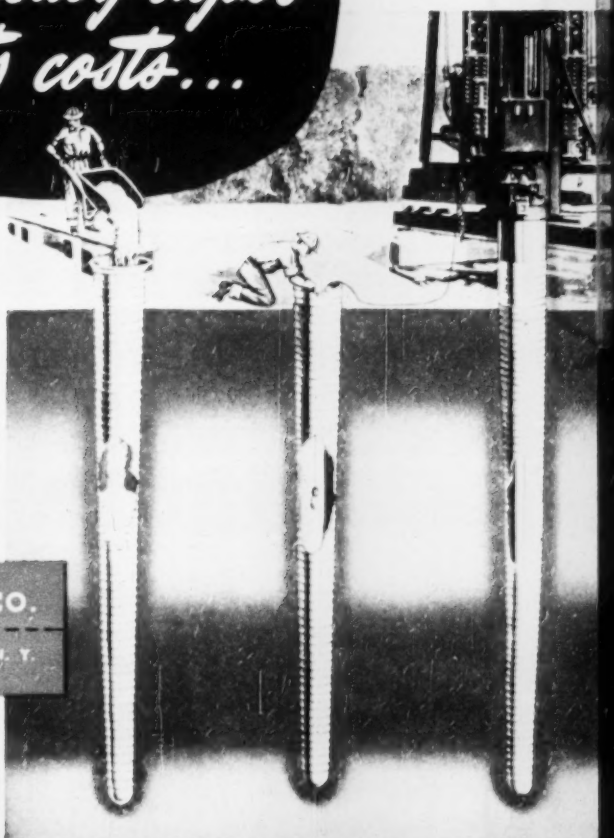
The heavy taper cuts costs...

Note that the permanent steel shell maintains the soil pressure developed during driving and while the concrete is setting, thus insuring a perfect pile free from defections with a high load capacity.

Raymond Standard Concrete Piles have a heavy, uniformly tapered permanent steel shell. On friction piles, this taper acts like a wedge, giving these specific advantages:

1. Driving resistance is maintained.
2. The load is transmitted to the soil through the entire length of the pile.
3. The load can be carried by shorter piles because of their greater carrying capacity.
4. Since shorter piles cost less to drive, the taper usually results in substantial savings.

Each of these statements has been tested and proved innumerable times. The evidence is at your disposal at any of our offices. Your inquiry is cordially invited.

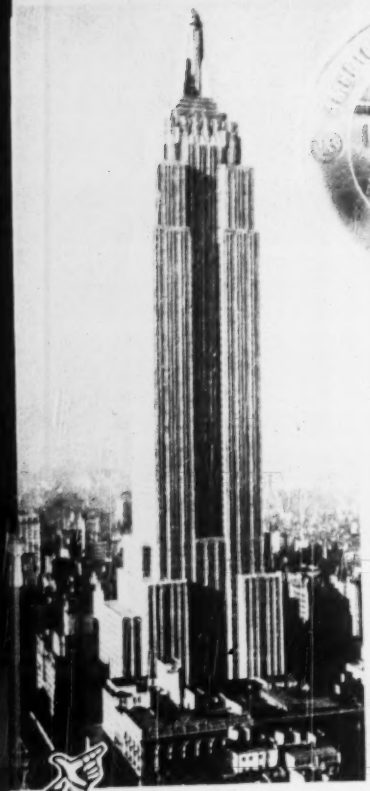


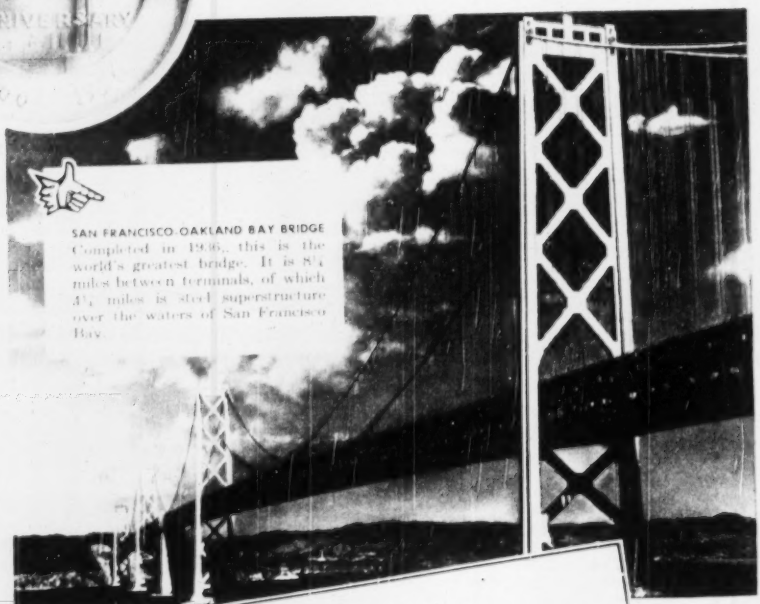
Raymond CONCRETE PILE CO.

140 CEDAR ST., NEW YORK 6, N. Y.

BRANCH OFFICES: Boston, Syracuse, Philadelphia, Baltimore, Washington, Pittsburgh, Atlanta, Miami, Houston, Kansas City, St. Louis, Cleveland, Chicago, Detroit, Portland, San Francisco, Oakland, Los Angeles and principal cities in Latin America

We pause to





SAN FRANCISCO-OAKLAND BAY BRIDGE Completed in 1936, this is the world's greatest bridge. It is 8¼ miles between terminals, of which 4¼ miles is steel superstructure over the waters of San Francisco Bay.

EMPIRE STATE BUILDING The Empire State Building was fabricated by American Bridge Company in 1930. It is the tallest structure ever built, towering 1,250' above the street level—86 stories topped by a 55' penthouse section and a 150' airship mooring mast.

THE FLATIRON BUILDING The Flatiron Building (Fuller) in New York City was fabricated by American Bridge Company in 1901. When completed in 1902, it was perhaps the tallest sky-scraper built up to that time.

A representative list of other American Bridge Company structures:

FABRICATED AND ERECTED

Athara River Bridge
Anglo Egyptian Sudan, Africa

Blue Water Bridge
St. Clair River, Pt. Huron, Mich.

Bronx Whitestone Bridge
East River, New York

Carquinez Strait Bridge
Crockett, Calif.

Charter Oak Bridge
Conn. River, Hartford, Conn.

Delaware River Suspension Bridge
Philadelphia, Pa.

Florianopolis Bridge
Santa Catharina Is., Brazil

Henry Hudson Bridge
New York City

Huey P. Long Bridge
Miss. River, New Orleans, La.

Lake Union Bridge
Seattle, Wash.

Thousand Islands Bridge
St. Lawrence River, N. Y.

Will Rogers Stadium
Broadmoor, Colo.

FABRICATED

Atlantic City Convention Hall
Atlantic City, N. J.

Carew Building
Cincinnati, Ohio

Chicago Post Office
Chicago, Ill.

Chrysler Building
New York City

Cleveland Municipal Stadium
Cleveland, Ohio

Grand Central Station
New York City

Outer Drive Bascule Bridges
Chicago, Ill.

Rockefeller Center—9 Buildings
New York City

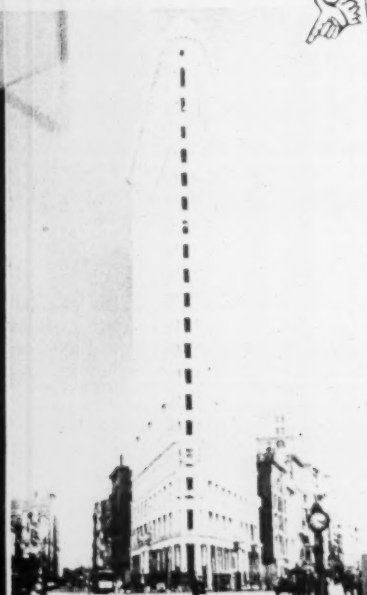
Russ Office Building
San Francisco, Calif.

Stevens Hotel
Chicago, Ill.

Wanamaker Stores
Philadelphia & New York

Woolworth Building
New York City

Yankee Stadium
Bronx, New York City



THE HELL GATE BRIDGE Completed in 1916, this bridge over the East River between Wards Island and Long Island, New York, was the largest arch span ever built up to that time.

reflect on 50 Busy Years

Come take a glance at just a few of the many jobs we have done over the past half century.

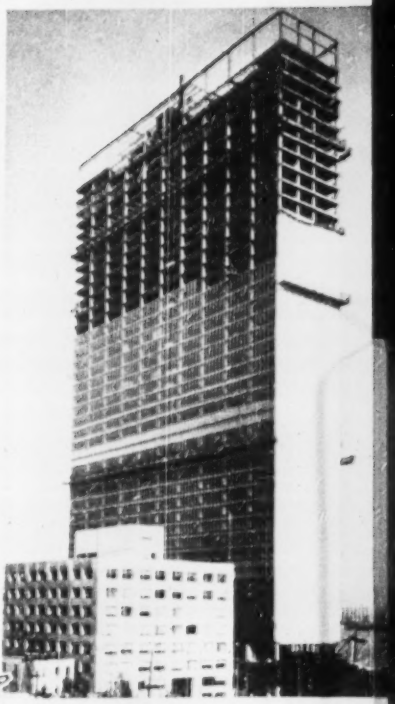
On May 12 the American Bridge Company celebrated its Fiftieth Birthday. But its structural steel experience and know-how are as old as the use of structural steel, and older. For the companies which merged in 1900 to form American Bridge Company brought with them a wealth of experience in the construction of all types of structures.

On these pages are shown but a few of the larger buildings and bridges fabricated, and in many instances, erected by American Bridge Company. Unfortunately space does not permit telling about the thousands of smaller steel structures which comprise a very important part of our Company's operations. For a more comprehensive picture, write for the booklet "Plants and Products - American Bridge Company." It is yours for the asking.

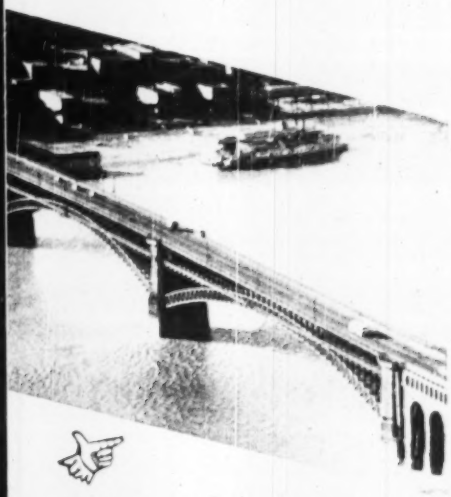
AMERICAN BRIDGE COMPANY

General Offices: Frick Building, Pittsburgh, Pa.

Contracting Offices in AMBRIDGE · BALTIMORE · BOSTON · CHICAGO · CINCINNATI · CLEVELAND · DENVER
DETROIT · DULUTH · ELMIRA · GARY · MINNEAPOLIS · NEW YORK · PHILADELPHIA
PITTSBURGH · PORTLAND, ORE. · ST. LOUIS · SAN FRANCISCO · TRENTON
UNITED STATES STEEL EXPORT COMPANY, NEW YORK



UNITED NATIONS SECRETARIAT BUILDING. This building has 39 stories above the street level and 3 basements. It is the first of three buildings making up the headquarters of the United Nations, New York, to be fabricated and erected by American Bridge Company.



EADS BRIDGE. Built in 1868-74 across the Mississippi River at St. Louis, Missouri, it was the first bridge in the United States in which steel was extensively used. The Keystone Bridge Company, one of the companies in the merger to form American Bridge Company in 1900, built this bridge.

THE BAYONNE BRIDGE. The Bayonne Bridge, spanning the Kill van Kull, was fabricated and erected by American Bridge Company. It was completed in 1931. This bridge has the longest arch span in the world.

AMERICAN BRIDGE

UNITED STATES STEEL

THIS LABEL has no substitute

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OBITUARY

Ewald D. Steinhagen, 63, a Richmond, Va., civil engineer who was with the Resettlement Administration in Washington, D. C., in the mid-'30s, died recently in Richmond as the result of an automobile accident.

Louis A. Deesz, 61, dean of the William Raven School of Engineering of Youngstown, Ohio College, died April 19, while in Washington to attend hearings on the proposed Mahoning Grand floodway. He was chairman of the Mahoning Valley Industrial Council's engineering committee, and had served as full-time dean of the Youngstown College engineering school since March, 1946, having previously been a part-time instructor for four years. Before going into the educational field, he had 25 years' industrial experience. He was a graduate of Carnegie Institute of Technology. In 1930 he went to Russia for Freyn Engineering Co. of Chicago, and also did construction work in Siberia.

Clement L. Reamer, 85, retired civil engineer, died April 19 in Toledo, Ohio. He had held several municipal, county, and state engineering posts. He was a graduate of Baldwin-Wallace College, and served several years as Coshocton County, Ohio, surveyor, was city engineer at Newark, Ohio, and assistant city engineer at Columbus. He later was a consulting engineer and was associated with the construction of several dams and bridges in Ohio and Pennsylvania. He retired in 1929.

Oscar Sidney Bowen, 82, who served for 38 years in the engineering department of the Great Northern Railway, died in Wenatchee, Wash., April 15. He was resident engineer for the railway in Seattle for many years and later was assistant to the chief engineer in St. Paul, Minn. His work was chiefly construction and exploration. He was vice-president of the ASCE in 1924-25.

Gilbert R. Field, 46, project engineer for the U. S. district engineers office at Ft. Worth, Tex., and his wife were killed in a collision with a truck near Houston on April 21. Mr. Field had been with the U. S. Engineers for 22 years and was a son of a former dean of the Georgia Institute of Technology.

Louis H. Otto, 64, ornamental ironworks contractor and manufacturer of ornamental and miscellaneous iron work, which included the present White House iron fence, died April 20 in Takoma Park, Md. Mr. Otto, who belonged to the Washington Building Congress, operated the Washington Stair and Ornamental Iron Works and his works adorn many Government buildings, including the Agriculture Department, many District public schools, the George Washington Memorial in Alexandria, Va. and the Central public library.

Col. Frank C. Boggs, 76, former head of the Army Engineers at Philadelphia, Pa., died April 18 at Paoli, Pa. He was graduated from West Point in 1898. During the building of the Panama Canal he was purchasing agent. He retired in 1928. Colonel Boggs was a technical adviser for the Century of Progress Exposition in Chicago.

Arthur V. Lynch, 62, engineer of subways for the Boston, Mass., Metropolitan Transit Authority, died April 24 at North Quincy, Mass.

Brig. Gen. F. D. Peck, 71, U. S. A. retired, died in San Francisco, Calif., April 22. A graduate of West Point, 1901, General Peck in the first world war built railroads in France and took part in the St. Mihiel and Meuse-Argonne offensives. For a time he was division engineer of the North Atlantic Division, with headquarters at New York, and he had also been in the Office of the Chief of Engineers in Washington, D. C.

Victory Memorial Bridge to be built at Nashville

State Highways Commissioner L. W. Eggleston of Tennessee says that work will begin early this summer on the $4,000,000 Victory Memorial Bridge over the Cumberland River at Nashville. The cost of this bridge and approaches is now estimated at $4,081,000, instead of the $2,300,000 appropriated. The bridge will be 770 ft long with a channel span of 320 ft and end spans of 225 ft each. Plans call for four traffic lanes, each 13 ft in width, with a 4-ft raised median strip and 5-ft sidewalks on either side.

The new bridge and approaches will start at Third and Main Streets on the east side of the river and will extend to the public square on the west side. On the west the new bridge will connect with the proposed Capitol Hill Boulevard, an 8-lane thoroughfare which is a part of the joint federal-state-city redevelopment program for the Nashville area surrounding the State Capitol.

Cheaper by the Yard

...or why contractors use ESCO Dipper Buckets

3-yard ESCO Cast-Welded dipper on Lima 1201, working on Cuyuna range stripping operation of S. J. Groves & Son.

GREATER PAYLOAD CAPACITY

per pound of bucket; fast loading; quick, complete discharge; ability to stand up under punishment—these are some of the qualities of *ESCO* Cast-Welded general purpose dipper buckets that give the operator more passes a day and more payload with each pass. They are the qualities that reduce the cost per yard of material moved.

Here are some of the jobs on which the built-in performance of *ESCO* buckets has been fully demonstrated: Neversink Dam; Garrison Dam; Pennsylvania Turnpike extensions; Merriam Dam; Washington-Baltimore Express Highway; Wautauga Dam; Beveridge Parkway; Pittsburgh Express Highway.

The records of sustained service made by *ESCO* dipper buckets under severe digging conditions are possible only because of their rugged construction. Details of construction and full information on sizes, dimensions and weights are contained in *ESCO* catalog 156-B. Get a copy from the *ESCO* office nearest you, or fill in and mail the coupon. Dealers in all major cities.

ESCO

DIPPER, DRAGLINE AND COAL LOADING BUCKETS

ELECTRIC STEEL FOUNDRY

2167 N. W. 25th Avenue, Portland 10, Oregon

Chicago, Ill. — Houston, Texas — Los Angeles, Calif.
Eugene, Oregon — Spokane, Wash. — New York City
Honolulu, T. H. — Seattle, Wash. — San Francisco, Calif.

In Canada — *ESCO* Limited, Vancouver, B. C.

ELECTRIC STEEL FOUNDRY

Left: Bruce Street, Alexandria's first soil-cement street, was paved in 1939.

Below: Woodland Terrace, a typical residential street, paved with soil-cement, 1941.

SOIL-CEMENT

paves the way to durable, economical streets in Alexandria, Va.

IN 1939, Alexandria, Va., experimented with soil-cement paving in a one-block-long project on Bruce Street. This pavement withstood the severe winter of 1939-40 without a single surface break while virtually every other secondary street in the city suffered heavily from the extreme weather.

That demonstration, plus soil-cement's low first cost, convinced city officials of soil-cement's practicability for light-traffic streets. Since then more than 200,000 sq.yd. of soil-cement pavement have been placed in Alexandria. The superior performance of that paving prompted the City Council in 1948 to pass an ordinance specifying soil-cement base with bituminous surface for light-traffic streets in residential zones and concrete for heavier-duty streets.

C. E. Watkins, Alexandria City Engineer, writes: "The first winter's experience on Bruce Street has been followed by more than 10 years of added service. Our records show that there has been practically no maintenance on the soil-cement base.

"Our choice of soil-cement is predicated on two important factors—economy and durability, plus the fact that our soil conditions are favorable. The initial cost and low-maintenance cost of all-weather soil-cement base make it economical. Its durability is proved by its record to date of carrying daily traffic for over 10 years. In my opinion, the use of soil-cement is a major and permanent asset to our city."

Here's why soil-cement roads and streets are economical: (1) about 90 per cent of the required material is usually native soil already on the site, (2) construction is fast—large daily production, (3) inexperienced crews can quickly learn the simple construction procedures. For more information about economical, durable soil-cement roads and streets, write for free booklet available in U. S. and Canada.

PORTLAND CEMENT ASSOCIATION

DEPT. 5b-17, 33 WEST GRAND AVENUE, CHICAGO 10, ILLINOIS

A national organization to improve and extend the uses of portland cement and concrete through scientific research and engineering field work

UNIT PRICES BID BY CONTRACTORS

New Water Supply for Bowling Green, Ohio

Close bidding from 45 contractors on the $1,400,000 Maumee River water supply project, Bowling Green, Ohio, resulted in contract prices averaging 5% below the engineer's estimate. Linkhorn, Petty & Stroup, Toledo, O., are consulting engineers.

The job is divided into two sections. A low service pumping station, B, 3 MGD water purification and lime soda ash softening plant, C, 45,000 feet of 20" transmission mains, and D, 12,000 feet of distribution lines within the city.

Wages to be paid for common labor are $1.50 per hour, for skilled labor from $1.65 to $2.375.

The contractors could bid on several alternates in sections B, C & D.

Bidders included:

A—Pumping station
1 Christopher Construction Co., Columbus, O. — $ 75,465.00
2 E. H. Taylor Co., Detroit — 78,509.00
3 Musser Construction Inc., Fremont, O. (Cont.) — 95,631.40
12 Getman Brothers, South Haven, Mich. — 102,000.00

B—Water treatment plant
1 C. A. C. Construction Co., Fort Wayne, Ind. (Bid on B only) — 941,000.00
2 Musser Construction Inc., Fremont, O. (Cont.) — 944,400.00
13 Getman Brothers, South Haven, Mich. — 947,317.00
(Cont.) Awarded contract on basis of combined bid for A and B of $991,867.

C—Transmission main
1 Omer Brauden & Son, Inc., Detroit (Contract) — $991,361.20
2 John Deluce Etc., Fort Wayne, Ind. — 113,955.00
13 Niles Excavating Co., Niles, Mich. — 120,209.50

D—Distribution system
1 Omer Brauden & Son, Inc., Detroit (Contract) — 96,905.75
2 Chas. F. McCurdy, Cincinnati, O. — 113,000.00
16 The Haddad Constr. Co., Columbus, Ohio — 109,277.50

Section A—Low Service Pumping Station

Item	Lump sum $	%Cont.	$
Entrance channel	8,764	3.6	$ 9,250
Low serv. pump sta.	46,140	19.0	48,687
Screenings	1,424	0.6	1,503
Low serv. turbine type pumps	6,200	2.6	5,865
Cont. cap. 500 gpm			
Cont. cap. 500 gpm	3,570	1.5	3,991
Piping	3,162	1.3	3,338
Electrical	6,000	2.5	5,923
Low serv. fr. mains	7,624	3.1	6,213
Cont. awarded combination A & B contract			

Section B—Water Treatment Plant

Item	Lump sum $	%Cont.	$
Chem. & lift bldg.	133,500	31.1	166,874
Chem. feeders	15,200	3.5	13,631
Rapid mix mech.	2,200	0.5	2,042
Slow mix mech.			
Transver. floc	5,900	1.6	5,509
Longitud. floc	4,650	0.9	4,252
Electrol.	8,600	1.5	8,152
Chlorg. equip.	5,810	1.2	4,817
Calcin. dock equip.	6,000	1.2	5,263
Liquid CO2 type	3,500	1.1	3,962
Dry ice type	2,500	0.8	2,963
Settl. house 1 mgd	47,000	11.1	65,109
2 mgd	36,000	11.3	53,756
Sldg. remov. mech. for			
1 mgd set bsn.	11,600	2.3	10,684
2 mgd set bsn.	10,000	2.0	9,394
Filter equip. units			
1–3 at wash. rates	26,000	5.3	29,405
1–3 at wash. rates	25,000	5.1	25,000
4 at wash. rate	9,000	1.8	9,000
* 2 at wash. rate	19,200	3.9	17,000
Prec. Wheeler bottom filter			
Flow meters	1,500	0.3	2,500
Hagan rate type			

Lump Sum

Item	$	%Cont.	$
Lab equip.	4,000	1.0	3,949
Chem. & lift bldg. piping	52,100	8.3	13,042
High serv. & wash water pumps	18,100	3.7	9,551
Heating	5,200	1.0	6,316
Elect.	20,000	4.0	21,994
Clear water reservoir			
1 million gal.	52,000	10.2	91,640
2 million gal.	50,000	10.2	84,224
Piping	11,200	2.5	13,010
Bldg. yd. & walks	2,990	0.5	2,819
Sewers	11,428	2.3	12,920
Seeding	1,210	1.1	2,761

1 per cent of section total.
* Precast Wheeler bottom filter — deduct $8,000
all-in wash troughs 2 of 3 — $ 600
shed wash troughs 2 of 3 — 300
N Other bidders bid from $2,000 to $3,600

Section C—Transmission Main

Item	Quantity	Unit prices $	%Cont.	$
Cast iron pipe				
20" bell & spigot	lf	43,300	$ 1.75	$ 1.14
20" mech. joint*	lf	43,300	1.33	0.61
16" bell & spigot	lf	43,300	.26	0.10
16" mech. joint	lf	43,300	.19	0.5
16" bell & spigot	lf	43,300	1.46	0.5
16" mech. joint	lf	2,500	1.42	0.5
6" bell & s*	lf	43,300	2.86	3.00
20" steel pipe	lf	43,300	9.42	9.29
18"	lf	43,300	3.64	3.25
16"	lf	43,300	2.79	2.27
20" Lock Joint	lf	43,300	5.45	5.32
18"	lf	43,300	4.15	3.32
16"	lf	43,300	2.79	2.27
12"	lf	43,300	2.28	1.89
Gate valves & boxes				
20"*	ea	11	861.45	713.00
18"*	ea	11	625.00	651.00
16"*	ea	11	529.32	440.00
6"*	ea	2	241.10	100.00
Air relief valves*	ea	29	250.00	225.00
Pressure relief valves*	ea	3	832.25	2,500
Check valves*	ea	11	1,100.00	2,200
Deduct if no cathodic protect. on st. pipe				
20", 18", 16"				3,200

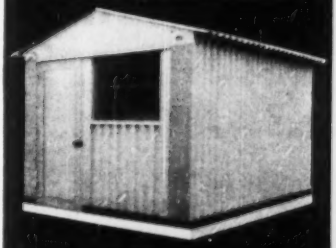
Section D—Distribution Mains

Item	Quantity	Unit prices $	%Cont.	$
Cast iron pipe				
20" bell & spigot	lf	3,100	$ 2.78	$ 1.70
20" mech. joint*	lf	3,100	3.63	3.53
16" bell & spigot	lf	500	2.16	1.69
16" mech. joint*	lf	500	2.79	2.46
16" bell & spigot	lf	500	2.16	1.69
16" mech. joint	lf	500	2.79	2.46
12" bell & spigot	lf	2,900	1.71	1.31
12" mech. joint*	lf	2,900	2.21	1.91
10" bell & s*	lf	20	1.10	.62
8"*	lf	50	1.33	1.19
6"*	lf	200	2.11	1.34
4"*	lf	50	2.11	1.04
20" steel pipe	lf	3,100	9.42	10.61
18"	lf	200	3.64	3.61
16"	lf	200	2.79	2.46
20" Lock Joint	lf	3,100	5.45	5.36
24"	lf	200	6.92	6.94
16"	lf	100	2.21	2.19
Asbestos-cement pipe				
12"	lf	6,200	1.92	1.78
10"	lf	20	1.93	1.64
8"	lf	30	1.26	1.01
6"	lf	200	2.46	1.23
4"	lf	50	2.46	1.23
Gate valves & boxes				
20"*	ea	2	784.00	1,500
16"*	ea	2	625.00	650.00
12"*	ea	32	355.00	350.00
10"*	ea	1	325.00	300.00
8"*	ea	1	300.00	300.00
6"*	ea	3	241.10	300.00
4"*	ea	1	241.10	241.00
New fire hydrs.*	ea	2	116.00	232.00
Exist hydr. to mv*	ea	2	70.00	140.00
Reconnect & sterilz exist 8" main*	lf	30	1.84	1.500
Exist pave. to bs*	sy	200	6.00	1,200
New conct. sdwks.*	sf	1,500	.40	600
Rock excav.*	cy	400	10.00	4,000
Deduct if no cathodic protect. st. pipe 20", 16", 16"				Indf.

* contract awarded on these items.
24" and 12" bidders bid their item — $ 1,000.1
24" $ 1,050; 12" $ 2,250

Quantity adjustment price
Excav. and D&S
Conct. in place
Reinf. st. in place

A 10' X 12' LOW COST STEEL BUILDING OF 1,000 USES



Portable or Permanent
USF HANDY-HUT
No Field Welding or Riveting
2 Men Can Erect
Expansible!

Just the ticket for a field office, tool house, storage house, pump house or any one of a thousand uses for contractors and engineers. The USF Handy-Hut is an all-steel, prefabricated formed steel frame that simply bolts together with box corrugated roofing and siding sheets that attach with clip-and-wedge fasteners. No special tools are needed, no field punching, welding or riveting is required. Meets fire and windage codes, most localities and is suitable for either permanent or portable use. Multiple units may be erected to accommodate any size requirement without special engineering.

USF also produces larger steel buildings of the same general construction in 10' and 12' clear heights with 20' or 30' span widths for erection in length multiples of 15'-4" to any desired size.

WRITE FOR DATA

USF United Steel Fabricators, Inc.
Wooster, Ohio

CONSTRUCTION REPORTS

Bids Asked—Low Bidders—Contracts Awarded

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.
ELSIE EAVES, Manager J. A. MAHONEY, Reports M. R. ROESSLER, Statistics

WATER SUPPLY

BIDS ASKED

Va., Staunton (B.A.)

+ Georgia (B.A.)

N. Y., Niagara Falls (B.A.)

Va., Staunton (B.A.)

Tex., Pleasanton (B.A.)

Calif., Ventura (B.A.)

La., Hartford

La., Breaux Bridge (B.A.)

Atlanta

Monmouth

Ark., Hot Springs (B.A.)

▲ Tex., Dallas

Tex., Eagle Pass

† Wash., D. C. (B.A.)

▲ † N. W. Los Angeles

Tex., Dallas

Tex., Houston

L. BIDDERS

La., Jeanerette

$14,995

N. J., Trenton

$42,766

CONTRACTS AWARDED

Ga., Marietta

$33,865

Ore., Grants Pass

$69,472

SEWERS, WASTE DISPOSAL

BIDS ASKED

Ill., Chicago (B.A.)

Mich., Warren (B.A.)

Va., Cape Girardeau

PROJECTS COVERED

Projects—By Size

Classes of Construction

Stages Reported

For full

Symbols and Abbreviations Include:

▲

LOW

CD Construction Daily

Tex., Dallas (B.A.)

LOW BIDDERS

Miss., Tyson

$133,757

$54,200

Tex., Fort Worth

$130,095

CONTRACTS AWARDED

Neb., Sterling

$58,976

+ N. J., Trenton

$67,351

D. Ariz.

$842,755

Ore., Portland

$715,741

Ore., Sherwood

Continued on page 81

Created for an Entirely New FWD work-range

NEW!
Model LD
14,500 lbs
Gross Vehicle Weight

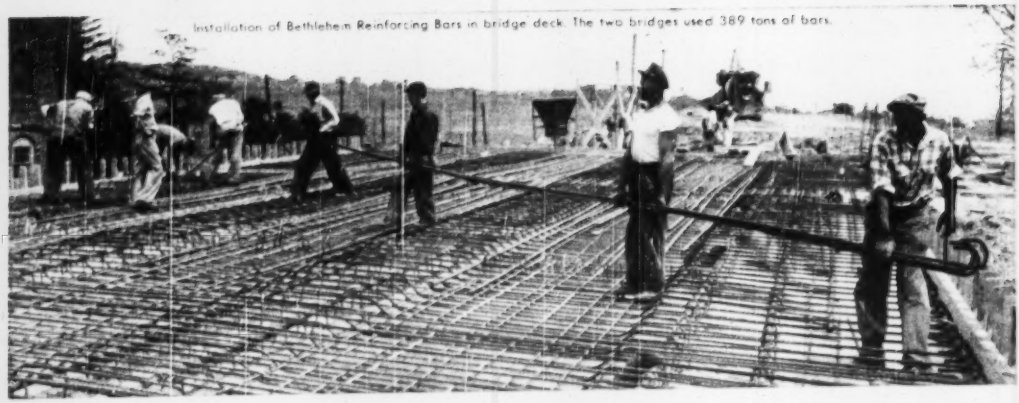
At last! A true LIGHT-DUTY four-wheel-drive

You never before have had a choice of owning a truck like the LD. So, check over your operations now—to see where this light-duty four-wheel-drive can save and make money for you, too! Yes, conventional trucks and *conversions* have sought to answer the needs of this work-range. But only a *true* four-wheel-drive can bring you the correct distribution of load and power—for maximum traction, economy and all-weather safety. You also get a *real truck engine* and *real truck components*—so essential to efficiency in this largest segment of the over-all truck field.

GET ALL THE FACTS on the LD! Ask for the folder... The Story of the LD! See your FWD distributor or write FWD.

THE FOUR WHEEL DRIVE AUTO CO.
Clintonville, Wisconsin
Canadian Factory: Kitchener, Ont.
World-Wide Sales and Service

Built by the Makers of America's Foremost Heavy-Duty Trucks



Installation of Bethlehem Reinforcing Bars in bridge deck. The two bridges used 389 tons of bars.

Improving a Highway in Eastern Pennsylvania

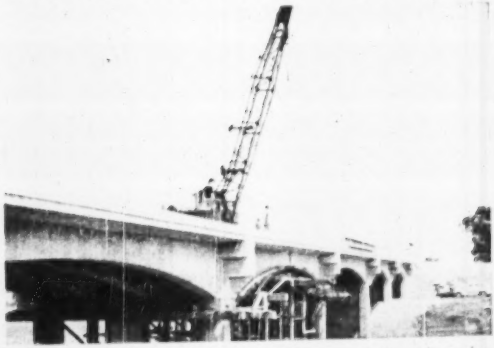
Frances C. Wagman (at left), and George A. Wagman, contractors, refer to blueprint in checking progress of job.

One of two new concrete bridges in the relocation project, shown above shortly before completion, carries the two-lane highway over railroad tracks.

Bethlehem Cable Guard Rail, mounted on Bethlehem Steel Posts at bridge approach, affords constant protection to motorists using the new highway.

Continuing its highway improvement program, the Pennsylvania Department of Highways recently authorized relocation of 10.15 ft of Route 24, near York, Pa. Included in the construction of the new 2-lane road were two reinforced concrete bridges. Contractor: G. A. and F. C. Wagman, Inc., Dallastown, Pa. In addition to structural steel and bridge reinforcing, Bethlehem furnished dowel units, cable guard rail and steel posts.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.



Crane, rigged with heavy-duty wire rope, prepares to lower boom for new load. Bethlehem Wire Rope has many uses in road construction.

STEEL FOR HIGHWAYS

Dowel Units • Reinforcing Bars • Bar Mats • Guard Rail
Guard Rail Posts • Wire Rope and Strand • Pipe
Hollow Drill Steel • Spikes • Bolts and Nuts
Timber Bridge Hardware • Tie Rods
Sheet- and H-Piling • Fabricated Structural Steel

BETHLEHEM STEEL

Continued from page 80

R. I., East Providence—Town Bd. (selectmen, Town Hall, Centr.) sewerage sys., extens. (Watchemoket System), to C. L. Guild Constr. Co., Inc., 94 Water St., $621,858. Bids 4-13. CD 3-23.

S. D., Sioux Falls—City, paving 39 blocks sanitary sewer in West Sioux Falls, to Colwill Bros., 2545 S. Granger St., $61,396.

Tex., Houston—Home Owned Properties, Inc., Scanlan Bldg., sewage disposal plant, to Teleplex Constr. Co., 1710 Telephone Rd., $50,000. CD 4-24.

BRIDGES

BIDS ASKED

La., New Orleans—B.A. S. Ter.—Port of New Orleans, No. 2 Canal St., Rm. 203, highway bridges at Pub. Community Warehouse, Plum Street, $2.

New York—B.D. 5-17—New York State Bridge Auth., 22 Kerry St., Kingston, making borings, securing samples and other work incidental thereto, on and adjacent to Hudson River in an easterly vicinity of Kingston, in vicinity of Marlboro, approx. 5 ft. north of Kingston-Rhinecliff bridge, to Raymond D. Bowman, 212 Liberty St., New York, Z-in-c. Constr. empl. CD 4-14-49.

O., Dayton—B.A. 5-18—Comm., Montgomery Co., Jesse B. Sweet, Civ. Courthouse, plans extend bridge 247 on Old Dayton Rd. in Madison Twp. CD 4-24-49.

† California—B.A. 5-23—Bureau Reclamation, Dept. Interior, Bldg. 53-A, Denver Federal Center, Denver, Colo., furnishing and hoisting cars shipping paint or f.o.b. cars, Newman, structural steel, rail beams, bearings, expansion joints, paint, nuts and bolts and diaphragms for county road bridges at stations 113 plus 38, 166 plus 38 and 232 plus 12, Newman Wasteway, Delta-Mendota Canal, Central Valley Proj., San Joaquin Co., N. McClellan, chf. engr.

Minn., Duluth—B.A. 5-23—St. Louis Co., W. H. Burgen, Aud., constr. 40-ft. 70-ft. steel beam span, 24-ft. roadway, bridge 5007, over St. Louis River, 2.5 mi. west of Zim, 6.4 mi. SAP 271, Min. Proj. 5924 (3). Approx. $50,000. Plans deposit $1.80, CD 4-22-49.

New Jersey—B.A. 5-23—New Jersey Turnpike Auth., veterans Room, War Memorial Bldg., Trenton, Gloucester, Camden and Burlington Counties—15 steel, concrete structures, cross-street paving and incidental work connection with Turnpike, Sect. 2, Woods Bury Heights to Hartford, consists of 2 plans, issued by Clement, Fleming, Conroy & Carpenter, Inc., 600 N. Broad St., Woodbury, N. J., empl. CD 7-24-49, under Streets and Roads.

† Oregon—B.A. 5-2—U. S. Eng., 628 Pittock Block, Portland, Ore., 2 concrete abutments and 5 piers for steel railroad bridge at the upper crossing of, and 1 mi. NW. of, Lowell, Elevation of top of stage 1014 plus 55 and 2055 plus 35, part of relocation of Southern Pacific Company's Cascade Line R. R. at site of Lowell Point Dam Reservoir on Middle Fork of Willamette River, approximately from railroad station at Lowell, Ore., to Jct. No. 1 (Via No. 31) (See ED 145).

Pennsylvania—B.A. 5-23—Pennsylvania Turnpike Comm., Harrisburg.

Allegheny Co.—Contract 1, structures, grading, drainage and paving Turnpike Sect. 10-E, Western extens. of Pennsylvania Turnpike, from point 180 ft. east to the Hampton-Indiana Twp. line, easterly 20,775 ft., to point 180 ft. east east of Township Road 587 in Indiana Twp. (approx. 4.95 mi.).

Allegheny Co.—Contract 2, grading, drainage and paving Sect. 10-E, western extens. Pennsylvania Turnpike from point 40 ft. east of centerline of Twp. Road 704 in Hampton Twp. easterly to 440 ft. east of line of Hampton-Indiana Twp. line, 3.21 mi. Plans deposit $50 each.

† Oregon—B.A. 4-21—U. S. Eng., 628 Pittock Block, Portland, 2 concrete abutments and 7 piers for steel railroad bridge at upper crossing of, and 1 mi. NW. of, Lowell. Elevation of top of stage 1014 plus 55 and 2055 plus 35. Part of relocation of Southern Pacific Company's Cascade Line R. R. at site of Lowell Point Dam Reservoir on Middle Fork of Willamette River, approximately from railroad station at Lowell, Ore., to Jct. No. 1 (Via No. 31) (See ED 145).

LOW BIDDERS

Oregon—State Hy. Comm., Salem, 1.167 ft. reinforced viaduct and grade separation structure, Coburg Road, Eugene, under Project [illegible], to [illegible], Eugene, $452,124. CD 4-12.

Oregon—State Hy. Comm., Salem, Apr. 28, 2 spans for Marion Street Bridge over Willamette River at Salem, Marion Co., from State St. to [illegible] St., South, Seattle, Wash., $172,444. [illegible], engr.

Ont., Ottawa—Dept. P. Wks., Bridge Br., substructure and superstructure of No. 8 [illegible] bridges between Quebec and Ashert [illegible] Co., Que., to [illegible], Ltd., Ottawa, Ont., Approx. $712,419.

CONTRACTS AWARDED

Calif., Sacramento—Sacramento [illegible] House, Auth., [illegible] bridge on Sacramento River, [illegible] to A. Teichert & Son, Inc., Sacramento, $526,300. Bids 4-19. CD 4-20, under [illegible].

▲ New Jersey—New Jersey Turnpike Auth., War Memorial Bldg., Trenton, Contr. 2, 17 steel concrete structures in connection with new Jct. between Newark and Elizabeth Plains, Woodbridge, Middlesex Counties, to P. T. Cox Constr. Co., Inc., 270 Broadway, New York, N. Y., $1,365,108. Bids 4-18. CD 4-20, under [illegible].

Oregon—State Hy. Comm., Salem, 504 ft. [illegible] steel bridge on Pacific Hy., near Roseburg, [illegible]

NEW "35" SINKER

Easy to handle, the new Thor 35-E Sinker features new Blower Valve for full line pressure blowing, in addition to all the many design and operating advantages that have made Thor Rock Drills outstanding performers wherever percussion tools are used.

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and the WARCO facts behind it

It's the CAB-CONTROLLED BLADE . . . that's the first big reason why the 4D WARCO motor grader yields the high productive factor. The operator bank-slopes in consecutive passes . . . at angles up to 90° . . . and never leaves his cab. There's no need to lose expensive time in backing up or "dead-heading" . . . every foot the WARCO travels is a foot it works!

Cost accounting figures justify the good judgment of contractors and highway departments who are investing their money wisely in WARCO. On big jobs and small . . . the 4D WARCO delivers the high productive factor. See the WARCO in action . . . 100 HP and 76 HP . . . that's the way to find out.

Here's Why WARCO Yields the HIGH PRODUCTIVE FACTOR

90° BLADE TRAVEL from one side to the other, cab-controlled • RETRACTABLE SCARIFIER blade revolves 360° without removing scarifier or teeth • HIGH WORKING CLEARANCES front and rear • INTERCHANGEABLE WHEELS • MECHANICAL STEERING with hydraulic booster • HYDRAULIC CONTROLS give immediate and positive response.

Model No. and H. P.	APPROXIMATE WEIGHT IN LBS. TOTAL	ON FRONT WHEELS	ON REAR WHEELS	BLADE PRESSURE
HEAVY DUTY 4D-100				
Without Cab or Scarifier	22,879	6,617	16,262	11,900
With Cab and Scarifier	24,593	7,774	16,819	13,922
GENERAL DUTY 4D-76				
Without Cab or Scarifier	21,356	6,279	15,077	11,205
With Cab and Scarifier	23,070	7,436	15,634	13,227

W. A. RIDDELL CORPORATION • *Bucyrus, Ohio*

BUILDERS OF WARCO MOTOR GRADERS • HERCULES ROAD ROLLERS

STREETS AND ROADS

BIDS ASKED

† Nebraska: B.A. . . . Davidson bldg., Kansas City, Mo. . . . Serial No. CIVENG 24-028(5)137. CD 4-24.

† New Hampshire: B.A. . . . Bureau P.R. Roads, Concord. . . . Gratton Co.: Proj. N. R-82. . . . New Hampshire Forest Hy. Proj.: Plans deposit $10.

Fla., Jacksonville: B.A. . . . City Hall. . . . CD 1/18/45.

† Fla., Key West: B.A. . . . Construction Officer, P. . . . at Naval Magazine, Fleming Key. . . . CD 4-25.

† Virginia: B.A. . . . Bureau P.R. Roads, Dist. Engr., Prince George and Dinwiddie Counties. . . . Petersburg, Suffolk, Military Proj.: Plans deposit $10.

Calif., Los Angeles: B.A. . . . Bd. Supvrs., Los Angeles. . . . Marie. . . . E. Avenue, Inc. engr. CD 4-25.

Minn., Olivia: B.A. . . . Bureau P.R. Roads, St. P. . . . Strom. . . . CD 4-25.

O., Columbus: B.A. . . . City Hall. . . . CD 4-25.

† California: B.A. . . . Bureau Reclamation, Dist. . . . Bldg., Los Angeles. . . . CD 4-25.

Mo., St. Louis: B.A. . . . City Hall. . . . CD 4-25.

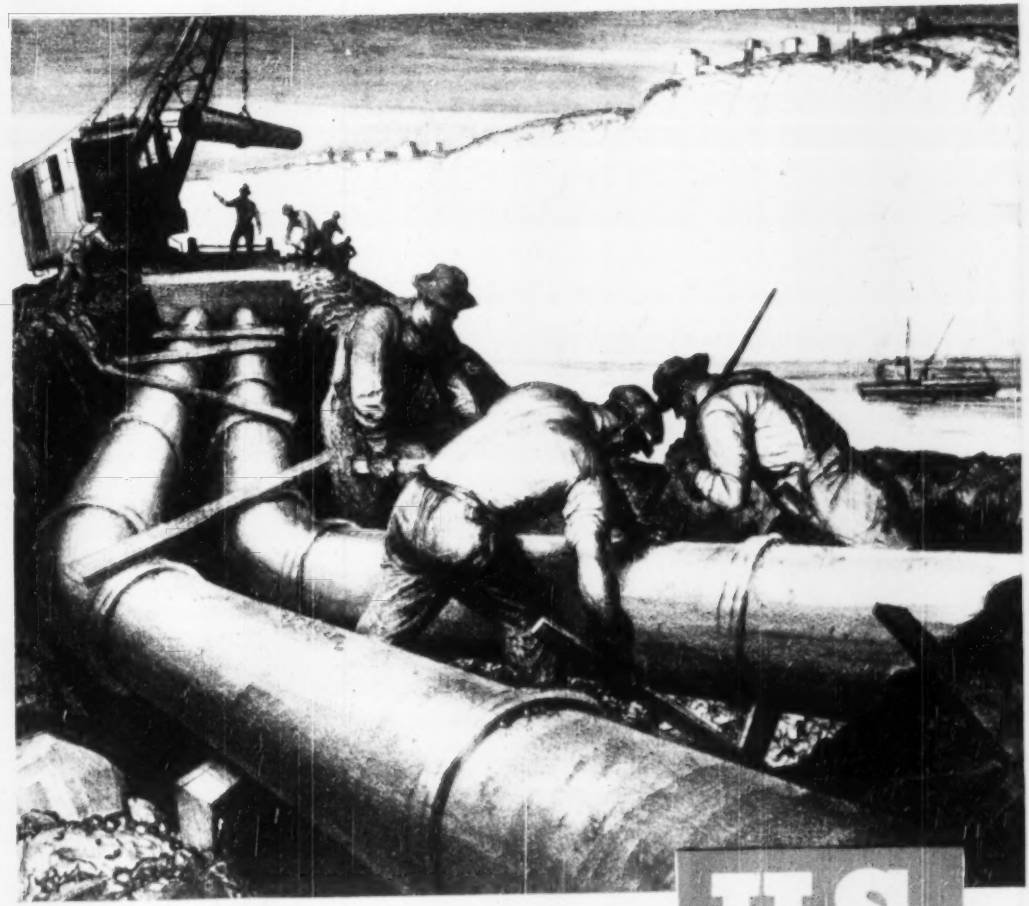
Tex., Dallas: B.A. . . . Bureau P.R. Roads, Austin. . . . CD 4-25.

Tex., Houston: B.A. . . . Texas Highway Dept., Austin. . . . CD 4-25.

LOW BIDDERS

▲ California: . . . $1,814,737. . . . $753,745. . . . $126,613. . . . $118,870. . . . $523,073. . . .

(Continued on page 86)



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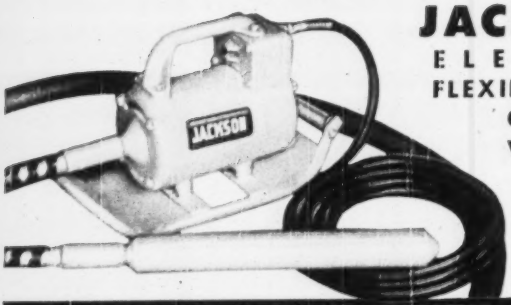
FOR WATER, GAS, SEWERAGE AND INDUSTRIAL SERVICE

Cast iron pipe is tough, husky, but not exactly handsome. What it lacks in eye appeal it makes up for in dependable quality. To see that our product's reputation for quality is lived up to—and to strive for still higher quality—this Company has made substantial investments in facilities for *quality control* and for *research and development*. The recently completed Research Laboratory and Developmental Foundry at Burlington is an important contribution to a long-range program of process and product development. **United States Pipe and Foundry Company, General Offices: Burlington, N. J. Plants and Sales Offices Throughout U. S. A.**



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MODEL FS-150A

WITH EVERYTHING THE GENERAL CONTRACTOR COULD WANT

POWER GALORE:
2½ HP (continuous duty rating) Universal Motor provides more than ample power for uninterrupted placing of the stiffest mixes using the maximum length of shaft.

LIGHT SOCKET OPERATION:
Wherever either 115 volt, 60 cycle single phase AC or Direct Current is available, this relatively inexpensive vibrator will do a bang-up job of concrete placement.

28 FOOT REACH:
Available with any length of shaft up to 28 feet. Maximum length makes hard-to-get-to places readily accessible — saves time by making frequent changes of vibrator location.

CONVENIENT — RUGGED CONSTRUCTION:
Double grip, skid-base handle with finger-tip control switch. Weighs only 50 lbs. Finest smooth-running flexible shaft and fittings — built to take the most severe usage.

GRINDING:
Countershaft attachment for quick conversion to wet or dry concrete rubbing.

HIGH FREQUENCY — 3 VIBRATOR HEADS:
8,000 to 10,000 VPM and availability of three vibrator heads assure rapid as well as thorough consolidation of the stiffest mix concrete under all conditions.

See this outstanding general-purpose electric vibrator at your Jackson Distributor or write for complete facts.

ELECTRIC TAMPER & EQUIPMENT CO.

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Provide exceptional pulling power, with the sharp energy of blow needed to vibrate and loosen stubborn set piling. These double-acting extractors come in two standard models—heavy and extra heavy. Standardized line also contains 10 double-acting hammers and 5 single-acting hammers. Write for free Bulletin 7.

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PNEUMATICALLY PLACED CONCRETE
DENSE—DURABLE—HIGH STRENGTH

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420 LEXINGTON AVE., NEW YORK 17, N.Y.
MURRAY HILL 3-7699

(Continued from page 84)

Line Rd., Combines Prvia. RS 1-253 and RS 1-410, Adair Co., L. B. $90,172, traffic bound limestone 1.861 mi., Dissappointment Rd. Rub Rd., Proj. RS 1-410, Adair Co., B. $14,813, local bank or creek gravel, 2.2 mi., Sumner and River Rd., Proj. RS 73-71, Linn Co., L. B. $127,022. CD 4-21 under LB.

Maine—State Hy. Comm., Augusta, Apr. 26, b. conc. 4.05 mi., F.A.P. FI 151-3), C.H.F., Augusta, from H.E. Sargent, Inc., Stillwater, $432,852. CD 4-12.

Maryland—State Rds. Comm., Baltimore, Apr. 25, macad. base and surf. course, 6.7 mi., beginning at Lakeville, State Rte. 316, and northwesterly to Great Marsh Creek Rte. 335. Constr. D 225-115, Dorchester Co., from H. Lee Fleming & Co., Salisbury, base $213,700, alternate $178,848. CD 4-12.

New Jersey—State Hy. Dpt., Trenton, Apr. 27, pavement resurf., Route 9, Sect. 3 from Shore Rd., City of Absecon, to Beach Theatre, Atlantic City, Atlantic Co., from eastern End of U.S. 4 N. North Carolina Ave., Atlantic City, $476,316. CD 4-7.

N. J.—Trenton—City, City Hall, Apr. 27, repaving E. State St. Section from Albert E. Barrett, New Willow St., $159,723. CD 12/40/45.

▲ Pennsylvania—State Hy. Dpt., Harrisburg, Apr. 28, crushed aggregate base with bit. surf., 13 ft. wide, bit. surf. for surfacing bridge 8,763 ft., L. R. 22014 (2), from point 3.04 mi. from Hershey-Northeastern Rd., Sect. 304 to Swatara Creek near Township Road, Sect. 304, Dauphin Co., from Mastercrete Constr. Co., Middletown, $93,922***construct divided highway consisting of two 24 ft. and variable width lanes of reinforced pavement, in either side of an earth depressed median, pavement 30, 36, 44 ft. wide, with a 4 in. bit. surf., 8 in. crushed aggregate base and 6 in. bit. surf., crushed stone base 27 ft. and variable 30 ft. wide and an 1 beam bridge, L. R. 22014 (2), Sect. 304, Dauphin Co., from Warren Bros. Co., Camp Hill, $1,236,611. (1-A). Appl. 240 ft. T. R. 15. 1 By-pass from point 3.04 mi. east of Media, easterly, 13.461 ft. Delaware Co. from Asphalt Paving & Supply Co., Chester, $923,401***crushed aggregate base with bit. surf. 20 ft. and variable to 44 ft. in width, widen pavement with crushed aggregate base 20 ft. and variable to 30 ft. in width, bit. surf. new base and existing pavement 20 ft. and variable in width for passing rail-road crossing, 6 in. P.C.C. pavement, 24 ft. in width, 1 R.C. bridge, 1 R.C. culvert, Monroe Co., from Beers Coal Corp., R. D. 1, Bangor, $129,711***widen pavement with crushed aggregate base 6 ft. variable in width, bit. surf. new base and existing pavement, construct crushed aggregate base with bit. surf. 20 ft., 22 ft. and variable in width, bit. surf. pavement 20 ft. and variable in width, construct reinforcement bridge 6,188 ft., L. R. 62058 (1-R), in village of Rocky Grove, north of Franklin, Venango Co., from Western Penna. Asphalt Paving Co., P. O. Box 1381, Erie, $47,629***bit. surf. pavement 20 ft. wide, incl. extensions, Sect. 1, from Bridge No. 1 over Conemaugh River, 0.940 ft., L. R. 1-61 (5), T. R. 31 between Eighty-Four and New Eagle Boro., Washington Co., from John E. Royer, George Washington Hotel, Washington, $357,596***crushed aggregate base with bit. surf. 18 ft. wide, incl. construction of 1 arch and extend 2 structures, construct reinforcement bridge 6,648 ft., L. R. 62005 (1), from near bridge 0.5 mi. northerly to intersection of Route 967, Washington St., Penn, & Town 200, Court House Bldg., Washington, $219,966. CD 4/3.

CONTRACTS AWARDED

California—State Div. Hys., Sacramento, plant mix on improved base material, surf. cement treated, 7 mi., on Grade Separation, between Atascadero and 1 mi. north of Templeton, 4.1 mi. between Atascadero and 1 mi. north of Templeton, San Luis Obispo Co., to M. J. Tennis Co., Inc., 722 E&S Bldg., Stockton, $649,297. Bids 4/12. CD 4/19, under LB.

Mo.—Kansas City—City, Reed McKinley, Dir. P. Wks., City Hall, widening, resurf. street, 12 contracts, to Missouri Valley Constr. Co., 2711 Grayhair Auto Bldg., Kansas City, Mo., $127,187. Bids 2/23, awarded 4/3. CD 2/1.

▲ New Jersey—New Jersey Turnpike Auth., War Memorial Bldg., Trenton, Contr. S 18 and 38, grading, drainage structures, overpass, underpass, stream bridge, structures, etc., for Sect. 1 Deepwater to Woodbury, Salem and Gloucester Counties to S. J. Groves & Sons Co., State Hy. 55, Woodbridge, $5,095,735. Bids 4/11. CD 4/13, under LB.

▲ Pennsylvania—State Hy. Dpt., Harrisburg, widen pavement with crushed aggregate base 4 ft. wide and bit. surf., new base and existing pavement, construct crushed aggregate base with bit. surf. 22 ft. wide, bit. resurf. existing pavement 18 ft. wide, incl. repairs to 15 places, etc., 42.1k2 ft., L. R. 307 (7), T.R. 322, between Port Matilda and Philipsburg Boros., Centre Co., to Donald B. Stabler, 635 Luckview Lane, Harrisburg, $529,521. 1 conc. base with bit. surf., 35.08 ft. in width on each side of an existing earth slip, plain P.C. conc. base with bit. surf. 34.08 ft. in width, bit. surf. pavement, 20,981 ft., L. R. 67004 (2), T. R. 15, S. 1, on Roosevelt Blvd., City of Philadelphia, Philadelphia Co., to James D. Morrissey, Inc., 5124 Frankford Ave., Phila., $709,190. Bids 4/11. CD 4/18, under LB.

Tex.—Houston—Home Owned Properties, Inc., Scanlan Bldg., Houston, paving, to Jacques Constr. Co., 1210 Texas Ave., $70,000. CD 4/14.

Alberta—Province of Alberta, Edmonton, asph. surf., 65 mi., from Wetaskiwin to Nisku, to Nisku Paving Co., Ltd., Nisku, $583,527. asph. surf., 11 mi., Lacombe to Teed, to Mannix O'Sullivan Paving Co., Ltd., Edmonton, $327,170. CD 12/3/43.

Equip Dump Trucks with Galion

Fulcrumatic HYDRAULIC HOISTS

Longer Service Life
Wider Payload Ranges

Galion Fulcrumatic Hoists give dump trucks a completely new range of payload usefulness. Improved smoother lifting fulcrums and oversized cylinders mean greater rated lift capacities . . . with entire hoist assembly strengthened to match. New Galion Fulcrumatics lift more, last longer because they work easier . . . *with less wear.* Yes, these are the most powerful Galion hoists ever built. Ask your Galion dealer how job-engineered Fulcrumatic hoists will better serve your material handling needs.

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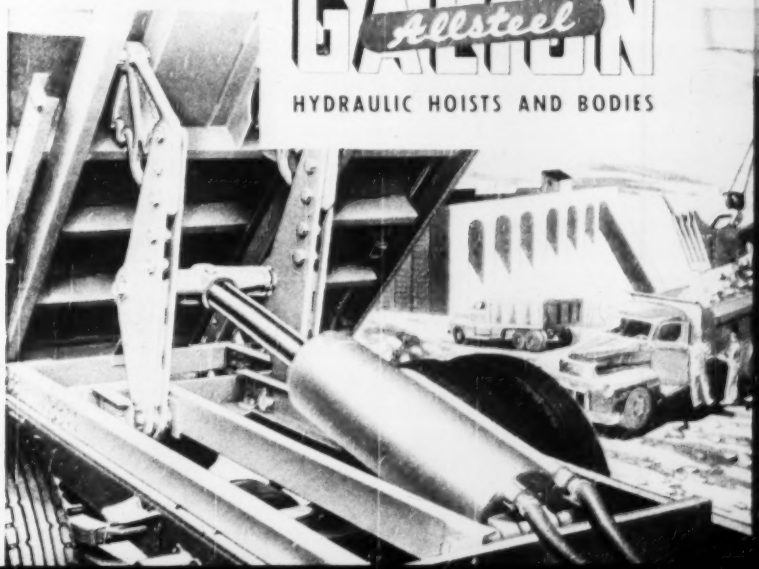
HYDRAULIC HOISTS AND BODIES



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When a vein of hard coal near Pottsville, Pennsylvania, became ignited, a nearby coal mine was threatened with destruction and the city of Pottsville itself became endangered.

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"Tag Master"

• ADVANTAGES

1. Less Booming
2. Less Swinging
3. Less Travel
4. Control of clamshell
5. Can be used as a Dipper Trip

• BECAUSE

1. Tagline pull can be increased *manually* to cast—twist or snub a clamshell, (or trip a bucket.)
2. *Automatic* setting maintains *uniform* tagline tension at *all* bucket levels.

• USERS REPORT

1. Increased performance
2. Low cost operation

There are years of experience behind every "TAG-MASTER."

MORIN MFG. CO.
WEST SPRINGFIELD, MASS.

Send "TAG MASTER" details to

Name

Address

Make—Size & Model of Machine

Continued from page 87

CONTRACTS AWARDED

† Florida ... $970,200

▲† Texas and Arkansas ... $1,858,103

Tex. Houston ... $40,000

▲† Virginia ... $1,026,270 CD 7-29-

AIRPORTS

BIDS ASKED

Conn. Windsor Locks ...

† S. D. Huron ...

† Wash. Whidbey Island ...

† Alaska Talkeetna ...

† Alaska Cape Newenham ...

LATIN AMERICA

† Cuba Havana ...

PUBLIC BUILDINGS

BIDS ASKED

N. Y. Pearl River ...

Ala. Edmonton ...

N. C. Cherryville ... $275,

Ont. Toronto ...

Wis. Springfield ...

Ga. Wrider ...

† Nebraska ...

▲ Old corridor ...

† Pennsylvania ...

† California ...

▲† Minn. Minneapolis ...

† Wyoming and South Dakota ...

† Arizona and California ...

Pennsylvania ...

$100,000

† California ...

LOW BIDDERS

† Arkansas ...

$614,750

† Idaho ...

$7,444,965

† Illinois ...

$501,404

† Kentucky ...

$545,216

▲† Louisiana ...

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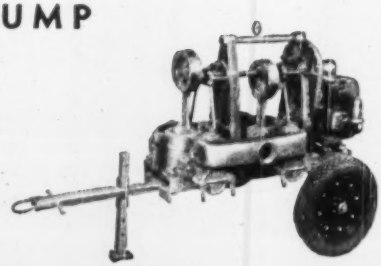

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Air-cooled, 4 to 8 H.P.
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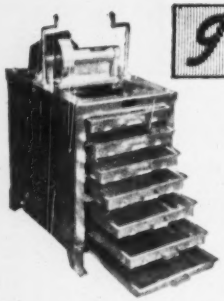

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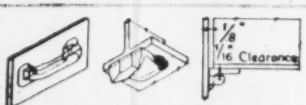

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Saxe Units place in position and securely hold together structural parts to be welded.

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(Continued on page 93)

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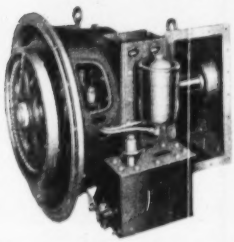

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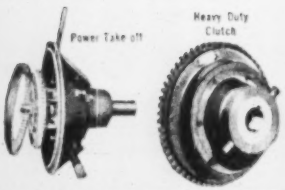

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(Continued from page 90)

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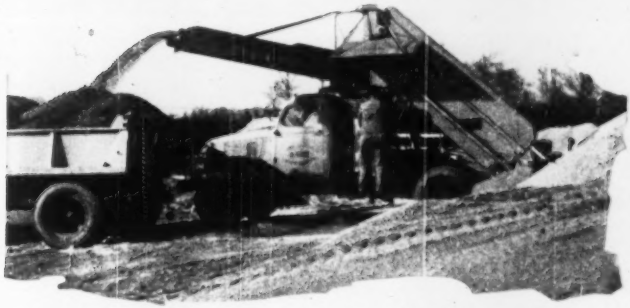

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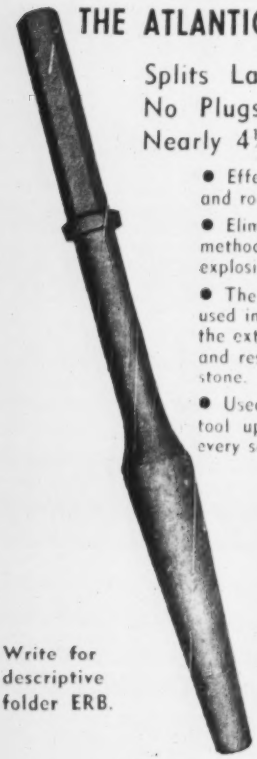

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LOW BIDDERS

▲ Conn., Hartford—HOUSING—City of Hartford Housing Auth., Bds. Asylum Ave., Apr. 25, moderate rental housing, Albany Rd., from F. H. McGraw & Co., 51 E. 42 St., New York, N. Y., $3,020,000. CD 4-17.

Pa., Erie—SCHOOL—Bd. Educ., Erie, Apr. 12, 1 story brick, reinforced concrete Glenwood School, Peach and Ridley Sts., from Washington & Ostergard, 1115 Peach St., $366,000. CD 4-7.

Tenn., Savannah—HOSPITAL—Hardin Co., Savannah, Apr. 25, hospital, from Smith E. Grant & Assoc., Porter Bldg., Memphis, $396,990.

CONTRACTS AWARDED

▲ Calif., Porterville—INSTITUTION—State Div. Architecture, Pl. Bldg., Sacramento, general contract, to erect 1 story, 275,000 sq. ft. State Institution for Feebleminded, Porterville, comprising 66 Bldgs., Box 117, Stockton, $1,496,682. Bids 4-18. CD 4-25, under LB.

▲ Conn., Bridgeport—HOUSING—City of Bridgeport Housing Auth., Anthony Rd. and Ethel Walker Rd., 504 dwelling units, from Fuller Construction Co., 50 E. 42 St., New York, N. Y., $3,794,440. Bids 4-17. CD 4-25, under LB.

Conn., Norwich—HOUSING—Town of Norwich Housing Auth., Bldg. Committee, 53 Family units, off Elizabeth St., Bay Street, from Gilbane Bldg. Co., 229 Huntington St., Hartford, $509,890. Bids 4-11. CD 4-25, under LB.

▲† Ill., Chicago—HOSPITAL—Veterans Admin., 1 unit, Add. Area between 16 and 17 St., N. W. Wash. Ave. and Fairfield Ave., N. W., 1 story reinforced concrete hospital for veterans, Administration, at 816, Health and Psychiatric Clinic, 1 story, 60x90 ft., Bldg. 817, Boiler & Laundry Bldg., 1 story, 60x90 ft., Bldg. 818, Garage & Utility Bldg., 1 story, 60x90 ft., Bldg. 819, Chapel & Auditorium, 1 story, 60x90 ft., Bldg. 820, Recreation Bldg., 1 story, 60x90 ft., Bldg. 821, Shop & Warehouse Bldg., 1 story, 60x90 ft., Bldg. 822, Clinic & Laundry Bldg., 1 story, 60x90 ft., Bldg. 823, Power Plant, 1 story, 60x90 ft., Bldg. 824, Garage & Utility Bldg., 1 story, 60x90 ft., Bldg. 825, Garage & Utility Bldg., 1 story, 60x90 ft., Bldg. 826, Garage & Utility Bldg., 1 story, 60x90 ft., Bldg. 827, Garage & Utility Bldg., 1 story, 60x90 ft., Bldg.

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(Continued from page 94)

Conn., Wethersfield — HOUSES — Liberty Homes, Inc., 1305 Main St., Hartford, 100 family units, Forest Dr., Beach Tree Dr., Cornish, Fletcher and Laconia Rds., Owner builds. $850,000.

Ill., Chicago—CHAPEL—Congregation Helpers of the Holy Souls, 325 S. Barry St., Zone 14, chapel, to McCarty Bros., Inc., 1846 W. Harrison St., Zone 7, $250,000. Awarded 4/24. Barry & Kay, 53 W. Jackson St., Zone 4, archts.

Ind., Anderson—HOUSES—Watson Co. Ltr. Co., 1415 Jackson St., 30 houses in Indian Meadows addn. between State Rd. 9 and by-pass. Owner builds. $250,000.

▲ Kan., Kansas City—RESIDENCES—Winn-Ray Corp., 1029 Main St., Kansas City, 6, Mo., 400 houses, Meadow Lake, near here. Owner builds. $5,000,000.

Kan., Topeka—OFFICE—Owner, c/o Stookey & Howells, archts., Insurance Bldg., 3 story, 100x125 ft. office, 401 Topeka Blvd., to M. A. Worthington, National Bank of Topeka Bldg., Topeka. $250,000. CD 3/3.

Pa., Pittsburgh—SYNAGOGUE, etc.—Tree of Life Congregation, 218 Craft Ave., 2 story, 91x90 ft., 14x62 ft., 44x16 ft., brick, stone, steel frame synagogue and school, Shady and Wilkins Sts., to Regina Constr. Co., 130 6 St., $309,000. Bids 4/4. CD 3/31.

Tenn., Memphis — HOMES — Jacobson & Lovitt, c/o George Mahoney, archt., Columbian Mutual Tower, 50 homes in Sharron subdivision. Owner builds. $250,000.

Tex., Dallas—DWELLINGS—Moody & Tise, 701 Forest Ave., 45-50 addtl. dwellings. Owner builds. $275,000. CD 3/3/44.

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Que., St. Laurent—FACTORY—F. C. Brossard, archt., 1440 W. Ste. Catherine St., Montreal, soon lets contract, 1 story, 150 x 180 ft., concrete, structural steel, brick factory, Kings Rd. for Perkins Tissue Mills, Ltd., 624 Guy St., Montreal.

LOW BIDDERS

Ala., Montgomery — SALES and SERVICE—Ray Brock Motor Co., c/o Pearson, Tittle & Nardan, archts., First Natl. Bank Bldg., construction equipment sales and service building, to Jehle Bros., 618 Mt. Meigs Rd. $132,864. CD 4/1.

N. D., Velva—GENERATING PLANT—Central Electric Power Cooperative, Velva, boiler feed pumps, from Pacific Pumps, Inc., 5215 Hunter St., Huntington Park, Calif., $51,975; cooling towers, from Marley Co., Inc., Kansas and Marley Rd., Kansas City, Mo., $92,047; boilers, to Combustion Engineering Corp., 1114 1-2 Front St., Fargo, Engrs. CD 12-27.

CONTRACTS AWARDED

Ark., Camden—WAREHOUSE—Camden Paper Mills, Inc., to be operated as unit of Southern Kraft Division, to Dougherty Constr. Co., 200 Myer Rd., Little Rock, $80,000. Bids 4/5.

▲ Ark., El Dorado—VAPOR and RECOVERY UNIT—Pan American Petroleum Corp., El Dorado, 2nd thermal catalytic cracking unit and related facilities, to Foster Wheeler Corp., Shell Bldg., Houston, Tex. Approx. $2,700,000.

Ind., Peru—PLANT—Gen. A. Thomas & Co., Peru, 100 x 200 ft. steel, concrete plant, separate contracts, $150,000.

Md., Baltimore—WAREHOUSE—Lawrence Davis Co., 1 W. Fayette St., 1 story, 100 x 135 x 210 ft., to Consolidated Engineering Co., Franklin St., $225,000. R. H. Hunt, archt.

N. J., Monmouth Junction—WAREHOUSE, etc.—[illegible] Trenton, 2 story, 134 x 200 ft. and 44 x 60 ft., to [illegible] $250,000.

N. J., Trenton—FACTORY—[illegible] Whitehead Rd., 1 story, 200 ft. square, to [illegible] $100,000. Roy [illegible] A. Bowers, 100 [illegible]

Okla., Oklahoma City—PLANT—[illegible] 124 N. W. 23rd St., [illegible] $475,000

Pa., Pittsburgh—[illegible] Bridge, [illegible] $200,000

Tenn., Memphis—[illegible] $100,000

Tex., Garland—[illegible] $200,000

Tex., Houston—[illegible] $75,000

Ont., Toronto—BUILDING—Dunlop Tire & Rubber Goodrich Co., 1145 Queen St. E., 2 story, 80 x 270 ft., to [illegible] $350,000. E. A.

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BIDS ASKED

LOW BIDDERS

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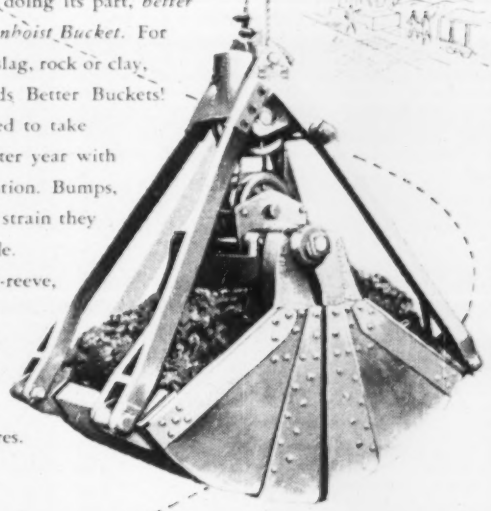

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Miss., Blackstone—Town, Bd. Selectmen, Tex., Hall, water sys. improv., Incl. elev. stor. tank, pumping equip., etc., $450,000. H. J. Ballew & Assocs., Belzoni, engr.

Miss., Sikeston—City, Mayor, W.W. extens. improv., Approx. $450,000. Boyle & Assocs., 308 Front St., Memphis, Tenn., engrs.

N. C., Carthage—Town, Bd. Commrs., Water Dist. No. 2, Moore, water sys. improv., Incl. 135,000-gal. elev. stor. tank, pumping equip., etc., $135,000. Harper, Ferguson & Assocs., 1st Citizens Bank Bldg., Columbia, S. C., consult. engrs.

▲ N. C., Raleigh—City, Bd. Water Comrs., Raleigh, water sys. improv., Incl. 2,000,000-gal. elev. stor. tank, pumping equip., etc., $175,000; Add'l. Fds. Req'd., $35,000. Improv. water sys., $145,000. Improv. sewer sys., $100,000. Bd. Water & Sewer Comrs., engrs.

Okla., Bethany—City, voted bonds, improve water sys., $298,000. Hudgins, Thompson & Ball, 2100 W. Main St., Oklahoma City, consult. engrs. (CD 1-17-50)

Tex., Abilene—City, water sys. improv., Incl. $100,000 water stor. tank, $200,000. Improv. sewer sys., $150,000. Improv. sewage treatment plant, $550,000.

Tex., Highlands—Harris County Water District & Improv. Dist. 1, water sys. improv., WW. sys. improv., Approx. $135,000. (CD 5-24)

Tex., Lancaster—City, voted bonds, W.W. sys. improv., $300,000. Freese and Nichols, 2403 Burnett Trust Bldg., Dallas, consult. engrs. (4-17)

Wash., Aberdeen—City, Chehalis County, steel pipe for transmission pipeline, $463,700. N. A. Cummins, water supt. (CD 5-1-50)

Ont., Forest (Postal Dist. Ottawa)—Town, Bd. Comrs., water sys. improv., Incl. 150,000-gal. elev. stor. tank, Mueller Rd., $150,000. Dist. Engr., Dept. of Planning & Development, Ottawa.

Ont., Niagara Falls—City, water sys. improv., Incl. duplicate water supply main, $500,000.

SEWERS, WASTE DISPOSAL

Ark., Manilla—City, sewerage sys., $124,000. Dickinson & Wilson, 1121 Boyle Bldg., Little Rock, consult. engrs.

Calif., Los Angeles—Bd. Supervs., Los Angeles Co., Flood Control Dist., Incl. 108,300-cu. yd. earth dam, 70,600-cu. yd. earth dike, Workman Mill Rd., Rio Hondo, $649,800. Bd. Supervs., engrs.

Mass., Newburyport—City, sewerage treat. plant, $550,000. Metcalf & Eddy, 50 Congress St., Boston, engrs.

Mo., Glendale (St. Louis 22, P.O.)—City, City Hall, sewer sys. improv., Est. $400,000. Bd. Aldermen, engrs.

Mo., St. Louis—City, Bd. of Public Service, pvmt., Rd. Dist. No. 1, Section 1, Manchester Rd., Zone 3, Section 12, Manchester Rd., Zone 4, engrs. (CD 5-1-50)

N. Y., Port Washington—Port Washington Water Dist., Nassau Co., sewerage sys., Incl. 3 pumping sta., $465,000. Nassau Co. Dept. Public Works, Mineola, engrs. (CD 5-1-50)

▲ N. C., Raleigh—City, Bd. Water Comrs., Raleigh, sewage treatment works, $460,000. Improv. sewer sys., $450,000. (CD 5-15-50)

Tex., Highlands—Harris County Water District & Improv. Dist. 1, Highlands, water sys. improv., sewage collection system, $265,000; sewage treatment plant unit, $44,573. (CD 5-24)

Tex., Houston—City, $50,000,000 bonds, sewage sys. improv., $70,000,000 bonds, Turkey Creek flood control project, $10,000,000 bonds, voted May 13. (CD 5-13-50)

Tex., Pasadena—Corporation, Harris County, City Water Control & Improv. Dist. No. 6, sewage collection system, $70,000; sewage treatment plant, $60,000, on 134-acre tract east of Houston. A. B. Moore, Pasadena, consult. engr.

Tex., Wichita Falls—City, sanitary sewer plant addn., $600,000. Bd. of Water & Sewer Bldg., consult. engrs. (CD 10-26-49)

Ala., Blakemore—Municipality, sewerage sys. and sewage disposal plant, $100,000. H. H. Stone, Calvary, engr.

▲ Ont., Hamilton—City, J. F. Berry, ex., trunk sewers on Mountain Top, $3,500,000. Proctor, Redfern & Laughlin, 11 Jordan St., Toronto, engrs. (CD 11/5/49)

(Continued on page 103)

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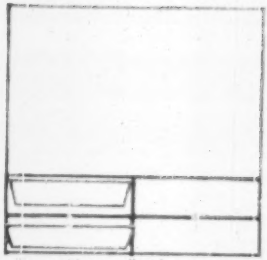

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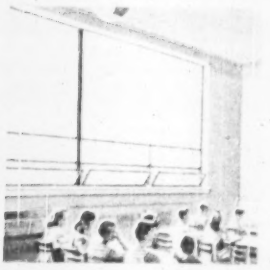

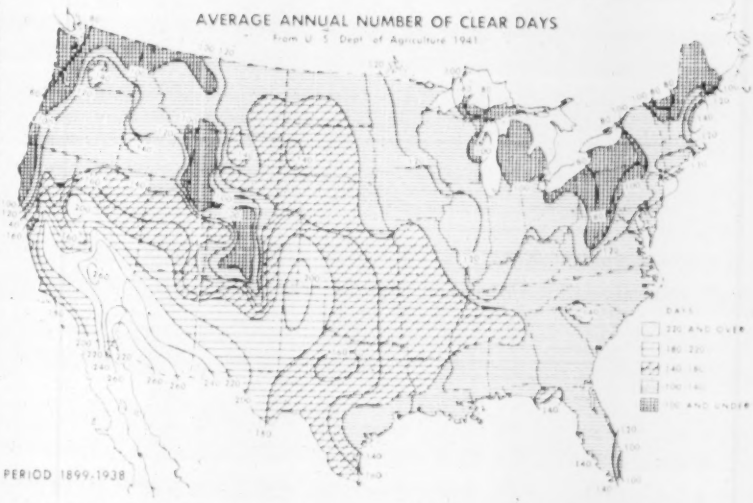

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Continued from page 98

Ont., Islington—Etobicoke Twp. Islington storm sewers for Alderwood Area, $170,000. F. MacArthur, 6446 Dundas St., engr.

Sask., Wilkie—Municipality, sewers, $105,000. CD 6-29-54.

Yukon Territory, Whitehorse—Municipality, sewerage, $300,000.

BRIDGES

Tenn., Maryville—Blount Co., c/o George D. Roberts, judge, Maryville, replacing bridge over Little River near Rockford, $130,000.

Tex., Abilene—City, Hickory Street, major widening, bridge, $200,000.

Wash., Seattle—King Co., County Road, Class A concrete bridge over Cedar River, $210,000.

▲ Wis., Milwaukee—City, Kinnickinnic River bridge, $1,300,000. Ralph C. Ashley, bridge engr., 2 E. 44th.

Manitoba—Province of, bridge over Nelson River on Hudson's Bay Railway Thicket Portage-Sipiwesk Power Site road, $100,000; a reinforced concrete bridge over the Pigeon River on Trans-Canada Highway, Ontario, $150,000.

Ont., Ottawa—Municipality of Gloucester, Twp., bridge at intersection of railway and Stanley Creek Rd., $125,000.

STREETS AND ROADS

Calif., Fullerton—City Council, $147,000 street improvements.

Calif., Los Angeles—Board of Supervisors, Division of Highways, Dept. of Public Works, 3 bridges, Lower Azusa Rd., El Monte, $62,500. C. E. Arnold, engr.

Neb., Lincoln—City, [illegible] $50,000; [illegible] $25,000; [illegible] $4,000.

Oklahoma—Oklahoma Co., [illegible] $700,000.

Washington—Pacific Co., [illegible] $440,000. W. A. Ely, co. engr.

Wash., Mount Vernon—[illegible] $350,000.

Wash., Seattle—[illegible] $60,000; [illegible] $14,000; [illegible] $101,300; [illegible] $136,400; [illegible] $49,800; [illegible] $77,000; [illegible] $22,000. R. H. Thomson, engr.

N. B., Woodstock—Municipality, street paving, $150,000. F. A. Patterson, Admiral, N. S., engr. SD 3-21-46.

Ont., Ottawa—City, [illegible] Approx. $125,000. H. Mott, C.E. Caller, engr.

EARTHWORK, WATERWAYS

+ Calif., Redwood City—City, City Hall, [illegible] $480,000. [illegible] Redwood Creek, [illegible] $100,000. [illegible] engr. CD 5-22-50.

AIRPORTS

▲ Fla., Miami—TURNPIKE—Dade Co., Commodore Dr., Miami Airport, [illegible] $2,000,000. CD 2-23-50.

Kan., Leavenworth—Atchison, Topeka & Santa Fe Railway, [illegible] $140,000. A. A. Hall, engr.

Neb., North Platte—Municipality, [illegible] $130,000.

Tex., Abilene—[illegible] $300,000.

LATIN AMERICA

Mexico, Ciudad Juarez—Mexican Govt., [illegible] $750,000.

Mexico, Guadalajara—[illegible] $400,000.

Mexico, La Paz—[illegible] $1,000,000.

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▲ Ala., Mobile ... $4,000,000

Calif., Campbell ... $950,000

Calif., Eureka ... $625,000

▲ Calif., Fresno ... $9,925,000

Calif., Oroville ... $750,000

Calif., Santa Paula ... $500,000

Calif., Walnut Creek ... $900,000

▲ Conn., Bridgeport ... $3,345,000

▲ Conn., Stamford ... $1,000,000

Del., Seaford ... $42,950 ... $312

▲ Del., Wilmington ... $1,000,000

Del., Wilmington ... $630,000

Idaho, Blackfoot ... $643,000

Ill., Mount Vernon ... $225,000

▲ Ill., Rock Island ... $650,000

▲ Ind., Elkhart ... $1,100,000

▲ Md., Baltimore ... $4,250,000

Md., Silver Spring ... $750,000

▲ Mass., Methuen ... $1,500,000

▲ Mo., St. Louis ... $2,500,000

▲ Mo., St. Louis ... $1,575,000

▲* N. J., Fort Dix ... $1,169,000

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TABLE I A.S.T.M. SERIAL DESIGNATION A305-49

Dimensional Requirements for Deformed Steel Bars for Concrete Reinforcement

		NOMINAL DIMENSIONS ROUND SECTIONS			REQUIREMENTS OF DEFORMATIONS		
Bar No.*	Unit Wt. Lbs. Ft.	Diameter Inches Decimal	Cross Sectional Area Sq. Inches	Perimeter	Max. Avg. Spacing Inches	Min. Height Inches	Max. Gap, Inches ‡
3	0.376	.375	0.11	1.178	0.262	0.015	0.143
4	0.668	.500	0.20	1.571	0.350	0.020	0.191
5	1.043	.625	0.31	1.963	0.437	0.028	0.239
6	1.502	.750	0.44	2.356	0.525	0.038	0.286
7	2.044	.875	0.60	2.749	0.612	0.044	0.334
8	2.670	1.000	0.79	3.142	0.700	0.050	0.383
9*	3.400	1.128	1.00	3.544	0.790	0.056	0.431
10*	4.303	1.270	1.27	3.990	0.889	0.064	0.487
11*	5.313	1.410	1.56	4.430	0.987	0.071	0.540

*These sections have the same weight and area as bars formerly known as 1" Sq., 1⅛" Sq. and 1¼" Sq.

‡Chord of 12½% of Nom. Perimeter.

† Bar numbers are based on number of ⅛" included in the nominal diameter of the bar section.

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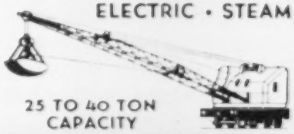

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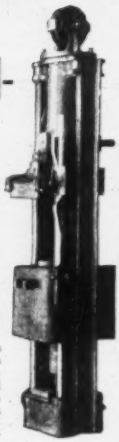

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▲ N. C. Jamesville—HOUSING—Jamesville Housing Authority, Jamesville, plans by W. B. Griffin, 405 N. Orange St., 275 housing units. Approx. $5,500,000. $4,500,000; rdy. $1,500,000. CD 4-19.

▲ N. C. Goldsboro—HOUSING—Goldsboro Housing Authority, Goldsboro, plans by W. B. Griffin, 405 N. Orange St., 275 housing units. Approx. $1,500,000. CD 4-19.

▲ N. C. Lexington—SCHOOLS—Bd. County Davidson, Lexington, plans by Leonard & Stockton, Lexington, voted bonds, $2,000,000; rdy. $1,800,000. Town of Thomasville, $700,000.

▲ N. C. Raleigh—SCHOOLS—Bd. County Wake Co., Raleigh, voted bonds, schools, $4,000,000. CD 3-16.

▲ N. C. Winston-Salem—HOUSING—Winston-Salem Housing Authority, Winston-Salem, plans by Northup & Associates, Atlanta, Ga., 210 housing units for Negroes. Approx. $1,000,000. CD 1-19.

▲ O. Youngstown—[illegible] $1,250,000. ... by John ... $700,000. CD ...

Okla. Muskogee—[illegible] $600,000 ...

Pa. Danville—[illegible] $435,391 ...

Pa. East Stroudsburg—[illegible] $425,000 ...

Pa. Torrance—[illegible] $600,000 ...

▲ Wash. Walla Walla—[illegible] $1,000,000 ...

▲ Alaska, Juneau—[illegible] $1,260,000 ...

Man. Winnipeg—LIBRARY—[illegible] $850,000 ...

N. S. Dartmouth—LABORATORY—[illegible] $450,000 Canadian ...

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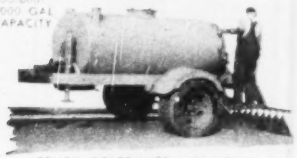

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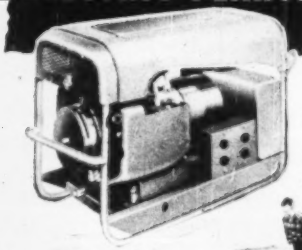

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▲ [illegible]

Pa., Chester — [illegible] $250,000

Pa., Greensburg — [illegible]

▲ Tex., Houston — [illegible] $7,500,000

Tex., Houston — [illegible] $750,000

▲ Tex., Houston — [illegible] $2,200,000

▲ Tex., Houston — [illegible] $3,000,000

▲ Tex., Pasadena — [illegible] $2,250,000

▲ Tex., San Antonio — [illegible] $100,000

▲ Wis., Appleton — [illegible] $2,500,000

Wis., Hillsboro — HOSPITAL—St. Joseph's Memorial Hospital, Order of Sisters of St. Francis, plans by Curtis & Gerhardt, 277 Jones St., Dubuque, Ia., [illegible] $433,000.

N. S., Halifax — COLLEGE, Mount St. Vincent College Addition, Halifax, college, $500,000.

Ont., Scarborough — HOSPITAL, Reverend Sisters of St. Joseph of the Diocese of Hamilton, proposed [illegible] $600,000.

Ont., Woodstock — [illegible] $500,000.

Que., Montreal — [illegible] $500,000.

▲ Que., Verdun — HOSPITAL, [illegible] $1,800,000.

Sask., Regina — BANK, Bank of Montreal, [illegible] $400,000.

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▲ Calif., Los Angeles — PLANT, [illegible] $2,000,000.

Calif., Los Angeles — WAREHOUSE, [illegible] $600,000.

▲ Ia., Fort Dodge — PLANT, [illegible] $1,000,000.

Mo., Alton, St. Louis, 23 P.O. — PLANT—Wm. Rogers Corporation, [illegible] $500,000.

▲ Mo., St. Louis — GARAGE, [illegible] $1,000,000.

▲ O., Cincinnati — PLANT—[illegible] $1,000,000. Total expansion $7,000,000.

▲ Va., Roanoke — PLANT—[illegible] $6,000,000.

▲ Wash., E. of Stanwood — [illegible] $2,000,000.

▲ Ont., Chatham — [illegible] $1,500,000.

Ont., Oshawa — [illegible]

Ont., Toronto — [illegible] $346,000.

▲ Que., Buckingham — [illegible] $2,000,000.

Que., Montreal — [illegible] $600,000.

Que., St. Jerome — PLANT, [illegible] $500,000.

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Va., Baltimore — [illegible] $550,000.

[illegible] $275,000.

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▲ Quebec — [illegible] $8,000,000.

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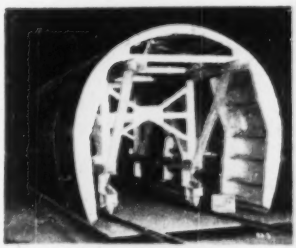

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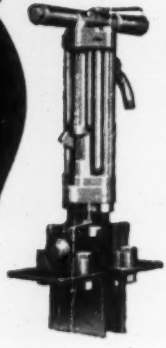
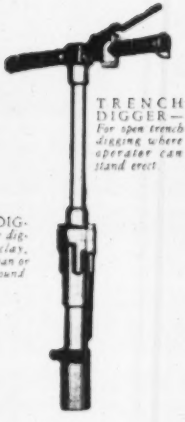
PAVING BREAKER— *Use in the hardest concrete demolition work. Street and Highway repairs.*



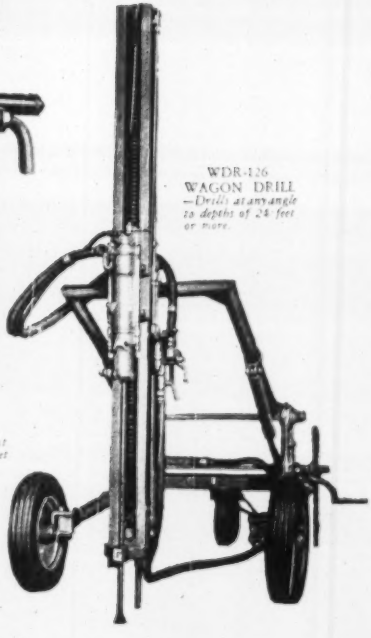
SHEETING DRIVER— *For driving wood or light steel sheeting.*

CLAY DIGGER— *For digging in clay, shale, hardpan or frozen ground.*



TRENCH DIGGER— *For open trench digging where operator can stand erect.*

ROCK DRILLS—*Fast drilling tools for either wet or dry drilling.*



WDR-126 WAGON DRILL —*Drills at any angle to depths of 24 feet or more.*

SCHRAMM INC.

The Compressor People

WEST CHESTER • PENNSYLVANIA

CONSTRUCTION REPORTS-Second Section

WATER SUPPLY

BIDS ASKED

SEWERS, WASTE DISPOSAL

BIDS ASKED

LOW BIDDERS

BRIDGES

BIDS ASKED

STATE HIGHWAY LETTINGS

LOW BIDDERS

STREETS AND ROADS

BIDS ASKED

STATE HIGHWAY LETTINGS

EARTHWORK, WATERWAYS

BIDS ASKED

LOW BIDDERS

AIRPORTS

BIDS ASKED

LOW BIDDERS

CONTRACTS AWARDED

LATIN AMERICA

PUBLIC BUILDINGS

BIDS ASKED

COMMERCIAL BUILDINGS

BIDS ASKED

Ont. Port Hope MEMORIAL CHAPEL B.A. Architects & Engineers, architects, 25 S. Mary St. Toronto, for Trinity College School, Port Hope. Approx. $250,000

Ia. Vinton HOSPITAL B.A. $15—55 Regents $373,000

Mo. Springfield HOSPITAL B.A. Allen $15—Burge Underwood & Lovell, Missouri Bldg.

Ga. Atlanta B. A. Thomasville Bldg. Thomasville, for Thomas Ward Lanier, archt. Ward Lanier & Thomas, Grant Bldg. Extended date

R. I. Providence HOSPITAL B. A. $16—Milton Bradley Co., Pawtucket, for Lifespan Corp. Brown & Jones, archts. Grosvenor Bldg. Providence, & Kivelson, 31 Newbury St., Boston

▲ Mo. Springfield HOSPITAL B.A. 17—St. John's Mercy Medical Center, Mercy Hospital, 21st Street & Main, for Sisters of Mercy of Union in America. Main and Associates, Zone B, archts. CD

▲ N. Y. Hudson HOSPITAL B.A. $18—Columbia Memorial Hospital, Inc., Hudson, for Columbia Memorial Hospital, Inc. Hudson. Mayer & Whittlesey, 1 Park Row, New York, Zone 1, archts.

▲ R. I. Providence HOSPITALS B. A. $18—Miriam Hospital, Providence, for Lifespan Corp. Brown & Jones, archts. Grosvenor Bldg. Providence, & Kivelson, 31 Newbury St., Boston

▲ Tenn. Kingsport HOSPITAL B.A. $23—Holston Valley Hospital, Kingsport, for Holston Valley Hospital. Mayer & Whittlesey, 1 Park Row, New York, Zone 1, archts.

Ill. Chicago HOSPITAL B.A. Asked—Michael Reese Hospital, 29 E. 29th St., for Michael Reese Hospital. Skidmore, Owings & Merrill, 33 W. Jackson Blvd., Chicago, archts.

▲ Ill. Chicago HOSPITAL B.A. Asked—Michael Reese Hospital, 29 E. 29th St., for Michael Reese Hospital. Skidmore, Owings & Merrill, 33 W. Jackson Blvd., Chicago, archts.

Ill. Evanston HOSPITAL B.A. Asked—Evanston Hospital, 2650 Ridge Ave., for Evanston Hospital Association. Holabird & Root, 400 W. Madison St., Chicago, archts.

Ill. La Grange HOSPITAL B.A. Asked—La Grange Memorial Hospital, 5101 S. Willow Springs Rd., for La Grange Memorial Hospital. Holabird & Root, 400 W. Madison St., Chicago, archts.

Tex. Fort Worth HOSPITAL B.A. Asked—Harris Methodist Hospital, Inc., Fort Worth, for Harris Methodist Hospital, Inc. Fort Worth. Perkins & Will, 141 E. Walton Pl., Chicago, archts.

▲ Tex. Fort Worth HOSPITAL B.A. Asked—Scenic Hills Hospital, Fort Worth, for Scenic Hills Hospital. Fort Worth. Perkins & Will, 141 E. Walton Pl., Chicago, archts.

▲ Tex. Houston HOSPITAL B.A. Asked—Memorial Hospital, Houston, for Memorial Hospital. Houston. Kenneth Franzheim, 1 Main St., Houston, archt. CD

Tex. Houston HOSPITAL B.A. Asked—Methodist Hospital, Houston, for Methodist Hospital. Houston. Kenneth Franzheim, 1 Main St., Houston, archt. CD

Tex. Midland HOSPITAL B.A. Asked—Midland Memorial Hospital, Midland, for Midland Memorial Hospital. Midland. Perkins & Will, 141 E. Walton Pl., Chicago, archts.

Tex. Lubbock HOSPITAL B.A. Asked—Covenant Hospital, Lubbock, for Covenant Hospital. Lubbock. Nabors, Giles & Waggoner, 1st National Bank Bldg. Lubbock, archts. Not to exceed $1,000,000

SOON LETS CONTRACT

▲ Colo. Colorado Springs CLUBHOUSE etc. A. G. Edwards & Sons, 409 N. Main St., St. Louis, Mo., for Broadmoor Hotel, Inc. Colorado Springs. Hoyt, Barnes & Gove, 1 Wilshire Blvd. Los Angeles, archts. & engrs. Extended date

N. Y. Woodbury

O. Steubenville

Wash. Seattle

LOW BIDDERS

▲ Calif. San Diego $3,820,235

▲ Ia. Cedar Rapids $1,310,000

N. D. Park River and Grafton $4,64,984

O. Sandusky $700,147

▲ Tex. El Paso $1,34,000 $417,000

▲ Tex. Houston $325,000 $475,000 $360,000 $350,000

CONTRACTS AWARDED

▲ Ark. Birmingham $1,500,000

▲ Ark. Pine Bluff

▲ Calif. Downey

▲ Calif. Glendale $1,344,000 $1,177,500

▲ Calif. Los Angeles

▲ Calif. Redwood City

▲ Calif. San Francisco

▲ Calif.

▲ Calif.

▲ Del.

▲ Fla. Hillsborough

▲ Ill. Chicago

▲ Ill.

▲ Ia. Sioux City $1,000,000

▲ Ky. Charlotte $1,000,000

▲ Mass. Lexington $2,500,000

▲ Mass. Williamstown $1,360,000

▲ Mo. St. Joseph $2,000,000

▲ Neb. Fort Cook

▲ N. J. Hackensack $1,000,000

▲ N. J. New Providence $1,000,000

▲ N. J. Trenton $1,500,000

▲ N. Y. Brooklyn $1,500,000

▲ O. Loveland $1,500,000

▲ O. Lyndhurst $4,500,000

▲ O. Wash. Courthouse $1,000,000

▲ Pa.

▲ Pa.

▲ Pa.

▲ Pa.

▲ Pa.

▲ Tex. Houston

▲ Tex.

▲ Va.

▲ Wis. Appleton

▲ Wis. Milwaukee $1,250,000

INDUSTRIAL BUILDINGS

BIDS ASKED

Mass. Boston

N. C. Concord

Ill. Chicago

Pa. Phila.

SOON LETS CONTRACT

▲ Idaho Boise

Ill. Kankakee $400,000

CONTRACTS AWARDED

Calif. Azusa $760,003

La. New Orleans $472,000

▲ O. Cleveland

▲ Pa.

▲ Pa. Lancaster $1,500,000

UNCLASSIFIED

BIDS ASKED

N. S. Halifax

+ Colorado

+ Fla. Green Cove Springs

+ Pennsylvania

+ Va. Norfolk

+ Colorado

+ Nebraska

OFFICIAL PROPOSALS

RATE: THE RATE FOR OFFICIAL PROPOSAL ADVERTISING IS $1.00 PER LINE (OR FRACTION) PER INSERTION

COPY RECEIVED UP TO 10:00 A. M. FRIDAY FOR ISSUE OUT NEXT THURSDAY SUBJECT TO SPACE OPEN FOR LAST MINUTE ADS

SEND COPY TO OFFICIAL PROPOSAL DIVISION, ENGINEERING NEWS-RECORD, 330 W. 42ND ST., NEW YORK 18, N. Y.

Bids: June 1 and June 2, 1950 (727)

Sewage Disposal System and Sewer Improvements

City of Tampa, Florida

Proposals are invited by the City of Tampa, Florida for construction of portions of the Sewage Disposal System and Sewer Improvements and will be received in the regular meeting place of the Board of Representatives until the following times:

Interceptor and Trunk Sewers and Force Main, 10:00 A.M., EST, June 1, 1950. Pumping Stations, 2:00 P.M., EST, June 1, 1950. Contract Items 10 A.M., EST, June 2, 1950. Sewage Treatment Plant, 2:00 P.M., EST, June 2, 1950.

Plans and contract documents may be examined and obtained at the office of the Superintendent of the Department of Public Works, City Hall, Tampa, Florida and at the office of Greeley and Hansen, Engineers, 220 South State Street, Chicago, Illinois.

City of Tampa, Florida
By Curtis Hixon, Mayor
Dated May 1, 1950

Bids: June 5, 1950 (711)

Sewage Treatment Plant

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
DEPARTMENT OF FINANCE
DIVISION OF PURCHASES

Sealed bids for constructing Buckin Point Sewage Treatment Plant in East Providence, Rhode Island will be received at office of State Purchasing Agent, State House, Providence, until 10 a.m. (Eastern Daylight Saving Time on June 5, 1950 and publicly opened and read at that time.

Project includes construction of seven one- and two-story buildings from 24'x26' ft. to 74'x128' ft., six Grit Channels, one Pre-Aeration Tank, 52'x212'x 9' ft., two Settling Tanks, each 88'x250' ft., two Sludge Digestion Tanks, 65' ft. diameter and 26' ft. diameter, respectively, two Sludge Distribution Tanks, each 20' ft. diameter, sewers, conduits, ponds and pipelines, equipment, and appurtenant work.

Drawings and contract documents may be seen on or after May 1, 1950 at above office of State Purchasing Agent, at office of Blackstone Valley Sewerage District Commission, State Office Building or Metcalf & Eddy, Engineers, 1200 Statler Building, Boston, Massachusetts weekdays except Saturdays and holidays, 8:30 a.m. to 4:30 p.m. and may be obtained from office of State Purchasing Agent on $100 deposit, $50 of which will be refunded to unsuccessful bidders upon returning the drawings and specifications in good condition after an award has been made.

Bid Security $2,500 certified check, bid bond or cash performance bond required.

Prevailing wage rates and Public Work labor laws apply.

EVELYN A. ADAMS
STATE PURCHASING AGENT

Contractors Watch This Section —

for new projects. Publish your announcements through the proposal sections of *Engineering News-Record* and get their bids.

The minute you seal the envelope you seal the verdict...

NO ONE but a bidder can decide, practically, whether he, or someone else, will be the successful bidder on any contract . . . because it is you — the bidder — who decide what you will charge to do the work. No one can decide that but you. So, you actually "write your own ticket."

NATURALLY, you must deliver certain specified materials and perform definite functions, within a certain time—that much of the job is something over which you have no control. But . . . it is when you begin to plan ways and means of DOING the job that you start to win or lose it. If you can do it more quickly, with less loss of motion, and, possibly, with fewer man-hours to charge against the job—in other words, at a lower cost to you — you will have the "edge" you need to make you the successful bidder.

LOW cost operation is usually the result of a thorough knowledge of the most efficient methods—and the use of modern equipment. You will be well repaid through your reading of ENGINEERING NEWS-RECORD—both editorial and advertising.

OFFICIAL PROPOSALS
(Continued from page 108)

Bids: May 23, 1950 (272)

New Jersey Turnpike Authority

Storage Reservoirs

OFFICIAL PROPOSALS

Furnishing and Delivering Compound Water Meters

State Road Work

CONTRACT 816
Federal Aid Project S-58-(2)
BLACKISTON TO CLAYTON
Kent County
C. C. Widening & Hot Mix Asphalt Surface

OFFICIAL PROPOSALS

CONTRACT 1020
Federal Aid Project E-486-(2)
FARNHURST INTERCHANGE
New Castle County
Concrete & Steel Grade Separation Structures And Approach Roadways

Continued on page 110

OFFICIAL PROPOSALS
(Continued from page 109)

Bids May 25, 1950 (732)
THE PORT OF NEW YORK AUTHORITY
PORT NEWARK
REPAVING CHANNEL STREET
CONTRACT EN-34

Sealed proposals for the repaving of Channel Street at Port Newark will be received at the office of the Chief Engineer, of The Port of New York Authority, Room 1306, 111 8th Ave., New York 11, N. Y., until 2:00 P. M. Thursday, May 25, 1950, and thereafter in the Auditorium of the Authority at the same address, until 2:30 P. M. on the same date, at which latter time and place said proposals will be publicly opened and read.

Contract documents may be seen at the office of the Chief Engineer and copies will be furnished upon deposit of $75.00 per set. The deposit will be remitted to the depositor upon plans returned in good condition not later than 20 days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Howard S. Cullman,
Chairman.

New York, May 11, 1950.

Bids May 25, 1950 (731)

Construction of Route Extension

STATE OF NEW JERSEY
STATE HIGHWAY DEPARTMENT
TRENTON

NOTICE IS HEREBY GIVEN that sealed bids will be received by the State Highway Commissioner for

ROUTE 29, EXT., SECTION 1, PERRY STREET RAMP

Construction of Route 29, Ext., Section 1, Perry Street Ramp, Underpass of Pennsylvania Railroad, Trenton Branch, and Southbound Station, City of Trenton, Mercer County, Federal Project No. CI-29(1). The principal items of construction are:

Excavation
Concrete in Structural Steel
Reinforcement Steel in Structures
Timber Sub-Structure Station

Bid for the above will be received at the office of the State Highway Department Room 1067, State House Annex, Trenton, New Jersey, on Thursday, May 25, 1950, at ten o'clock, (10:00 A.M. EASTERN STANDARD TIME), eleven o'clock (11:00 A.M. DAYLIGHT SAVING TIME), and will be opened and read immediately thereafter.

The receipt and opening of bids is subject to the proper qualification of the bidder in accordance with the provisions of the prequalification and the regulations adopted by the State Highway Commissioner. Bidders must have submitted a revised financial statement and statement of plant and equipment Supplement.

Drawings, specifications and form of bid, contract and bond for the proposed work are on file in the office of the State Highway Engineer, Trenton, N. J., and may be inspected by prospective bidders during office hours. Plans will be furnished on a deposit of Ten Dollars ($10.00) for each set of plans upon application to A. Lee Grover, Chief Clerk, State Highway Department, Room 1067, State House Annex, Trenton, N. J. Bids must be made upon the standard proposal forms in the possession of and issued by the State Highway Department and must be enclosed in sealed special addressed envelopes bearing the name and address of the bidder and work bid upon on the outside, and must be accompanied by a certified check drawn to the order of the Treasurer of the State of New Jersey for not less than ten percent (10%) of the amount of the bid, provided that a bond certificate check shall not be less than $2000.00 or more than $20000.00 and must be delivered at the above place on or before the hour named. Copies of the standard proposal forms and special addressed envelopes will be furnished on application. Bids not enclosed in sealed special addressed envelopes will be accepted informal and will not be opened. The right is reserved to reject any or all bids.

Signed: Spencer Miller, Jr.
State Highway Commissioner

Bids May 25, 1950 (730)

Reconstruction of Bridge & Approaches

STATE OF NEW JERSEY
STATE HIGHWAY DEPARTMENT
TRENTON

NOTICE IS IS HEREBY GIVEN that sealed bids will be received by the State Highway Commissioner for

ROUTE 28, SECTIONS 6A & 6B

Reconstruction of Middlebrook Bridge and Approaches on Route 28, Sections 6A and 6B, in Bridgewater Township and Borough of Bound Brook, Somerset County. Length 9,237 meas.

Estimated Roadway Items
2,000 cu. yds. Roadway Excavation—Earth
1,600 sq. yds. Pavement Excavation
2,400 cu. yds. Trench Excavation
2,000 cu. yds. Channel Excavation
115 Tons Pavement, Type MA-BC
1,000 sq. yds. 7" P.C. Mac. Inter. Course on 4" Mac. base

Bridge Items
924 cu. yds. Concrete in Structures
142,000 lbs. Structural Steel
41,000 lbs. Reinforcement Steel

Bids for the above will be received at the office of the State Highway Department, Room 1067, State House Annex, Trenton, New Jersey, on Thursday, May 25, 1950, at ten o'clock, (10:00 A.M. EASTERN STANDARD TIME), eleven o'clock (11:00 A.M. DAYLIGHT SAVING TIME), and will be opened and read immediately thereafter.

The receipt and opening of bids is subject to the proper qualification of the bidder in accordance with the provisions of the prequalification and the regulations adopted by the State Highway Commissioner. Bidders must have submitted a revised financial statement and statement of plant and equipment Supplement.

Drawings, specifications and form of bid, contract and bond for the proposed work are on file in the office of the State Highway Engineer, Trenton, N. J., and may be inspected by prospective bidders during office hours. Plans will be furnished on a deposit of Ten Dollars ($10.00) for each set of plans upon application to A. Lee Grover, Chief Clerk, State Highway Department, Room 1067, State House Annex, Trenton, N. J. Bids must be made upon the standard proposal forms in the possession of and issued by the State Highway Department and must be enclosed in sealed special addressed envelopes bearing the name and address of the bidder and work bid upon on the outside, and must be accompanied by a certified check drawn to the order of the Treasurer of the State of New Jersey for not less than ten percent (10%) of the amount of the bid, provided that a bond certificate check shall not be less than $2000.00 or more than $20000.00 and must be delivered at the above place on or before the hour named. Copies of the standard proposal forms and special addressed envelopes will be furnished on application. Bids not enclosed in sealed special addressed envelopes will be accepted informal and will not be opened. The right is reserved to reject any or all bids.

Signed: Spencer Miller, Jr.
State Highway Commissioner

U. S. Government

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. 3612) will be received by Bureau of Reclamation, Denver Dept., Washington, May 25, 1950, and then publicly opened, for furnishing labor and certain materials and equipment necessary for the installation of aluminum steel railing with lighting for Grand Coulee Dam, Columbia Basin Project, Washington. The work, to be installed at Grand Coulee Dam, located about 90 miles northeast of Odair, Washington. Principal items are approximately 1,500 linear feet of railing and control boxes, receptacles, conduit and control materials, including concrete work with lighting, concrete in cradle and other work. Time allowed for completing will be 120 days. For particulars, address Bureau of Reclamation, Office Engr., Washington, or Building 53, Denver Federal Center, Denver, Colorado.

MICHAEL W. STRAUS, Commissioner.
(738)

(Continued on page 111)

SEARCHLIGHT SECTION

This index is published as a convenience to the readers. Every care is taken to make it accurate, but Searchlight Section assumes no responsibility for errors or omissions.

AAA Adding Machine Co. 118
Air Compressor Rental Co. 113, 114
Albert & Davidson Pipe Corp. 121
American Air Compressor Corp. 116
Anderson Co., Robert B. 113
Babcock Equipment Co., Inc. 118
Bauer, L. W. 113
Belton Light & Power Co. 113
Bendix Machinery Co., Inc. 112, 116
Berger & Son Inc., C. L. 114
Beckerle Motors 118
Berkeley Distributors, Inc. 120
Bixby 112
Boers Equipment Co., Gil 119
Boyce Co. 113
Boyer, R. H. 117
Brown Co., Inc., Thomas C. 114
Bryson Instrument Co. 114
Buff 114
C & C Contracting Co., Inc. 118
Carlyle Rubber Co. 118, 119
Clemco Construction Co. 114
Coast Equipment Co. 118
Concrete Carriers, Inc. 120
Concrete Equipment Co. 120
Construction Equipment Corp. 116
Construction Survey Cooperative 113
Contractors Equipment Sales Co. 118
Contractors Machinery Co. 117
De Cristofer Construction Co. 114
Deadman Steel Corp., Hy. 120
Elliott Contracting Co., Inc. 114
Ellis-Newark Co. 120
Engineering Agency, Inc. 112
Ennis Supply Co. 117
Equipment Corp. of America 117
Everready Supply Co., The 117
Fabick Tractor Co., John 114
Fitzsimons Equipment Co., Inc. 114
Foster, L. B. 119, 121
Frank, M. K. 119
Frazer Davis Construction Co. 121
Furnival Machinery Co. 117, 118, 120
Great Lakes Carbon Corp. 119
Greensboro Machine Co. 117
Greenpoint Iron & Pipe Co., Inc. 121
Gurley, W. & L. E. 114
Hendricks, Bill B. 120
Hercules Electrical Machy. & Equip. Co. 116
Hickerson, Roy D. 114
Hodge & Hammond, Inc. 116, 117, 118
Hoisting Machinery Co. 118
Ingersoll-Rand Co., Canada, M. 116
Jenks, Elwood M. 120
Kline, Richard F. 119
LeKashman, L. 118
Lewis, Harry C. 120
Lima Engineering Co. 120
McCarthy, Inc., Warren E. 114
Mississippi Valley Equip. Co. 117, 118
Mundy Railway Supply Corp. 119
National Blue Print Co. 114
O'Neill, A. J. 116
Rhude & Fryberger 118
Schoonmaker Co., Inc., A. G. 116
Shannon & Co., J. Jacob 114, 120
Smith, Inc., H. B. 113
Solomon Construction Co. 114
Stanhope, Inc., F. C. 116
Tamilyn System 114
Thompson Co., Inc., J. Parker 114
Tractor & Equipment Co. 116
Troy Slag Products Co., Inc. 113
Vulcan Iron Works 117
Walsh Co., Richard P. 117
Warren Knight Co. 114
Weil & Co., J. H. 114
Weiss, B. M. 118
Weiss Steel Co., Inc. 120
Williams Construction Co. 120
Wilson Engineering Corp. 113

OFFICIAL PROPOSALS
(Continued from page 110)

Bids May 23, 1950 (7220)

PENNSYLVANIA TURNPIKE COMMISSION
Harrisburg, Pennsylvania

NOTICE TO BIDDERS

Sealed proposals will be received by the Pennsylvania Turnpike Commission, through the Secretary of said Commission, Harry C. Wiest, at the Office of the Commission, Harrisburg, Pennsylvania, until 10:00 A.M. (E.S.T.) DAYLIGHT SAVING TIME, on the 23rd day of May, 1950, and will be publicly opened and read aloud at that time and place.

Proposals will be received on the following contracts and will be subject to the conditions contained in the Contract Proposal Forms, Specifications and Plans now on file in the Office of the Secretary of the Commission, Room No. 2, North Office Building, State Capitol, Harrisburg, Pennsylvania, and may be inspected there and copies obtained upon application therefor.

For the construction of structures and the grading, drainage and paving of Turnpike sections in part of the Westfield Tunnel-Turnpike Extension to Hampton, Westfield and Delaware Township, Warren County, Pennsylvania, a distance of approximately 3.5 miles.

Beginning at a point approximately 0.6 mile east of the Westfield Tunnel, at the Forest Road crossing in Hampton Township, Warren County, Pennsylvania, and extending thence eastwardly to a point in the Township of Conewango, Warren County, Pennsylvania, at the Pennsylvania-New York State Line.

The approximate quantities for the principal pay items are as follows:

Class 1, Excavation, and/or fill, Cubic Yards 1,000,000
Class 2, Excavation, rock, Cubic Yards 1,000,000
Class 3, Excavation, Tunnel, Cubic Yards 1,000,000
Class 4, Excavation, Channel, Cubic Yards 1,000,000
Class 5, Excavation, Borrow, Cubic Yards 1,000,000
Class 6, Excavation, Unclassified, Cubic Yards 1,000,000
Class 7, Excavation, Structure, Cubic Yards 1,000,000
Class 8, Excavation, Trench, Cubic Yards 1,000,000
Class 9, Excavation, Channel, Cubic Yards 1,000,000
Class 10, Excavation, Borrow, Cubic Yards 1,000,000
Class 11, Excavation, Unclassified, Cubic Yards 1,000,000
Class 12, Excavation, Structure, Cubic Yards 1,000,000
Class 13, Excavation, Trench, Cubic Yards 1,000,000
Class 14, Excavation, Channel, Cubic Yards 1,000,000
Class 15, Excavation, Borrow, Cubic Yards 1,000,000
Class 16, Excavation, Unclassified, Cubic Yards 1,000,000
Class 17, Excavation, Structure, Cubic Yards 1,000,000
Class 18, Excavation, Trench, Cubic Yards 1,000,000
Class 19, Excavation, Channel, Cubic Yards 1,000,000
Class 20, Excavation, Borrow, Cubic Yards 1,000,000
Class 21, Excavation, Unclassified, Cubic Yards 1,000,000
Class 22, Excavation, Structure, Cubic Yards 1,000,000
Class 23, Excavation, Trench, Cubic Yards 1,000,000
Class 24, Excavation, Channel, Cubic Yards 1,000,000
Class 25, Excavation, Borrow, Cubic Yards 1,000,000
Class 26, Excavation, Unclassified, Cubic Yards 1,000,000
Class 27, Excavation, Structure, Cubic Yards 1,000,000
Class 28, Excavation, Trench, Cubic Yards 1,000,000
Class 29, Excavation, Channel, Cubic Yards 1,000,000
Class 30, Excavation, Borrow, Cubic Yards 1,000,000
Class 31, Excavation, Unclassified, Cubic Yards 1,000,000
Class 32, Excavation, Structure, Cubic Yards 1,000,000
Class 33, Excavation, Trench, Cubic Yards 1,000,000
Class 34, Excavation, Channel, Cubic Yards 1,000,000
Class 35, Excavation, Borrow, Cubic Yards 1,000,000
Class 36, Excavation, Unclassified, Cubic Yards 1,000,000
Class 37, Excavation, Structure, Cubic Yards 1,000,000
Class 38, Excavation, Trench, Cubic Yards 1,000,000
Class 39, Excavation, Channel, Cubic Yards 1,000,000
Class 40, Excavation, Borrow, Cubic Yards 1,000,000
Class 41, Excavation, Unclassified, Cubic Yards 1,000,000
Class 42, Excavation, Structure, Cubic Yards 1,000,000
Class 43, Excavation, Trench, Cubic Yards 1,000,000
Class 44, Excavation, Channel, Cubic Yards 1,000,000
Class 45, Excavation, Borrow, Cubic Yards 1,000,000
Class 46, Excavation, Unclassified, Cubic Yards 1,000,000
Class 47, Excavation, Structure, Cubic Yards 1,000,000
Class 48, Excavation, Trench, Cubic Yards 1,000,000
Class 49, Excavation, Channel, Cubic Yards 1,000,000
Class 50, Excavation, Borrow, Cubic Yards 1,000,000
Class 51, Excavation, Unclassified, Cubic Yards 1,000,000
Class 52, Excavation, Structure, Cubic Yards 1,000,000
Class 53, Excavation, Trench, Cubic Yards 1,000,000
Class 54, Excavation, Channel, Cubic Yards 1,000,000
Class 55, Excavation, Borrow, Cubic Yards 1,000,000
Class 56, Excavation, Unclassified, Cubic Yards 1,000,000
Class 57, Excavation, Structure, Cubic Yards 1,000,000
Class 58, Excavation, Trench, Cubic Yards 1,000,000
Class 59, Excavation, Channel, Cubic Yards 1,000,000
Class 60, Excavation, Borrow, Cubic Yards 1,000,000
Class 61, Excavation, Unclassified, Cubic Yards 1,000,000
Class 62, Excavation, Structure, Cubic Yards 1,000,000
Class 63, Excavation, Trench, Cubic Yards 1,000,000
Class 64, Excavation, Channel, Cubic Yards 1,000,000
Class 65, Excavation, Borrow, Cubic Yards 1,000,000
Class 66, Excavation, Unclassified, Cubic Yards 1,000,000
Class 67, Excavation, Structure, Cubic Yards 1,000,000
Class 68, Excavation, Trench, Cubic Yards 1,000,000
Class 69, Excavation, Channel, Cubic Yards 1,000,000
Class 70, Excavation, Borrow, Cubic Yards 1,000,000
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Class 466, Excavation, Unclassified, Cubic Yards 1,000,000
Class 467, Excavation, Structure, Cubic Yards 1,000,000
Class 468, Excavation, Trench, Cubic Yards 1,000,000
Class 469, Excavation, Channel, Cubic Yards 1,000,000
Class 470, Excavation, Borrow, Cubic Yards 1,000,000
Class 471, Excavation, Unclassified, Cubic Yards 1,000,000
Class 472, Excavation, Structure, Cubic Yards 1,000,000
Class 473, Excavation, Trench, Cubic Yards 1,000,000
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Class 492, Excavation, Structure, Cubic Yards 1,000,000
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Class 496, Excavation, Unclassified, Cubic Yards 1,000,000
Class 497, Excavation, Structure, Cubic Yards 1,000,000
Class 498, Excavation, Trench, Cubic Yards 1,000,000
Class 499, Excavation, Channel, Cubic Yards 1,000,000
Class 500, Excavation, Borrow, Cubic Yards 1,000,000
Class 501, Excavation, Unclassified, Cubic Yards 1,000,000
Class 502, Excavation, Structure, Cubic Yards 1,000,000
Class 503, Excavation, Trench, Cubic Yards 1,000,000
Class 504, Excavation, Channel, Cubic Yards 1,000,000
Class 505, Excavation, Borrow, Cubic Yards 1,000,000
Class 506, Excavation, Unclassified, Cubic Yards 1,000,000
Class 507, Excavation, Structure, Cubic Yards 1,000,000
Class 508, Excavation, Trench, Cubic Yards 1,000,000
Class 509, Excavation, Channel, Cubic Yards 1,000,000
Class 510, Excavation, Borrow, Cubic Yards 1,000,000
Class 511, Excavation, Unclassified, Cubic Yards 1,000,000
Class 512, Excavation, Structure, Cubic Yards 1,000,000
Class 513, Excavation, Trench, Cubic Yards 1,000,000
Class 514, Excavation, Channel, Cubic Yards 1,000,000
Class 515, Excavation, Borrow, Cubic Yards 1,000,000
Class 516, Excavation, Unclassified, Cubic Yards 1,000,000
Class 517, Excavation, Structure, Cubic Yards 1,000,000
Class 518, Excavation, Trench, Cubic Yards 1,000,000
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Class 520, Excavation, Borrow, Cubic Yards 1,000,000
Class 521, Excavation, Unclassified, Cubic Yards 1,000,000
Class 522, Excavation, Structure, Cubic Yards 1,000,000
Class 523, Excavation, Trench, Cubic Yards 1,000,000
Class 524, Excavation, Channel, Cubic Yards 1,000,000
Class 525, Excavation, Borrow, Cubic Yards 1,000,000
Class 526, Excavation, Unclassified, Cubic Yards 1,000,000
Class 527, Excavation, Structure, Cubic Yards 1,000,000
Class 528, Excavation, Trench, Cubic Yards 1,000,000
Class 529, Excavation, Channel, Cubic Yards 1,000,000
Class 530, Excavation, Borrow, Cubic Yards 1,000,000
Class 531, Excavation, Unclassified, Cubic Yards 1,000,000
Class 532, Excavation, Structure, Cubic Yards 1,000,000
Class 533, Excavation, Trench, Cubic Yards 1,000,000
Class 534, Excavation, Channel, Cubic Yards 1,000,000
Class 535, Excavation, Borrow, Cubic Yards 1,000,000
Class 536, Excavation, Unclassified, Cubic Yards 1,000,000
Class 537, Excavation,

SEARCHLIGHT SECTION

(Classified Advertising)

EMPLOYMENT: BUSINESS: **"OPPORTUNITIES"** :EQUIPMENT :USED OR RESALE

WANTED
PROJECT ENGINEERS
FIELD ENGINEERS

and inspection staff by large, long established engineering organization for long term water development program in Texas and Oklahoma areas. Supervisory and inspection staff must be experienced on dams, powerhouses, water supply and irrigation. Vacancies include resident engineers, layout engineers, concrete technicians, field accountants, surveyors, and inspectors. Resident engineers must be college graduates qualified by ample experience to take complete charge of engineering on large contract projects under Chief Engineer. Please submit completely detailed personal, education, and experience record and salary requirements with first letter. All replies strictly confidential.

P-6413, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

ESTIMATOR WANTED

With recent bidding experience in heavy Grading, Paving, Sewers and Bridges. Location, Long Island, New York. State experience, salary, and full particulars.

P-6529, Engineering News-Record
330 W. 42nd St., New York 18, N. Y.

ESTIMATOR

Wanted by established Pittsburgh firm of commercial and industrial contractors. Must have had experience with contractors engaged in similar work. State salary experience and when available. Splendid opportunity for advancement.

P-6399, Engineering News-Record
330 W. 42nd St., New York 18, N. Y.

GRAVEL PLANT SUPERINTENDENT

Wanted for operating and managing portable and permanent plants in Indiana and Michigan. State experience, references and salary.

P-6706, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

ENGINEER, LICENSED
in New York State
Also Sales Engineer

Experienced in bridge construction and alterations. Permanent position for right man. Reply stating experience to

P-6505, Engineering News-Record
330 W. 42nd St., New York 18, N. Y.

ENGINEER WANTED

Large Western pulp and paper mill manufacturing kraft, groundwood and sulphite pulp and papers and doing extensive converting seeks graduate engineer with 15 to 20 years mill experience gained principally in the pulp and paper business. Initial responsibility would be field supervision of maintenance, construction and shops embracing crew of approximately 300 employees. Successful man could work into plant engineering position within 3 to 4 years.

P-6510, Engineering News-Record
68 Post St., San Francisco 4, Calif.

WANTED SUPERINTENDENT

For Sewage and Water line construction operating principally in Indiana. Write only for interview giving experience in the above line of work, age, reference, salary expected.

P-6518, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

ESTIMATOR
WANTED

In Phila., experienced in general heavy construction work. Give information on experience, salary, availability. Experience with contractors preferred.

P-6411, Engineering News-Record
330 W. 42nd St., New York 18, N. Y.

SURVEYOR WANTED

Top notch registered surveyor capable of assuming charge of highway and bridge surveys for consulting engineer in Pittsburgh. Good salary, working conditions, and permanency. Our employees know of this ad.

P-6161, Engineering News-Record
330 W. 42nd St., New York 18, N. Y.

OFFICES for Sale. Address to offer sent to you
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CHICAGO: 520 N. Michigan Ave., 11th
SAN FRANCISCO: 68 Post St., 4th

CIVIL SERVICE

THOROUGHLY EXPERIENCED construction Superintendent with satisfactory background in design, construction, and handling personnel. Prefer engineering degree although not absolutely necessary. Salary open. Give letter stating experience, education, references and salary required. P-6416, Engineering News-Record.

POSITIONS VACANT

WANTED: EXPERIENCED Structural Detailer capable of taking responsible charge of work. Apply Stevenson & Valin, 381 Park Avenue, New York, N. Y.

WANTED: ESTIMATOR on reinforcing bars, steel sash and steel windows. Must be graduate engineer with bar company experience who can develop the sales position. Give age, salary desired. P-6424, Engineering News-Record.

ESTIMATOR FOR Pittsburgh industrial contractor. Experienced details in first letter including date, education, references, present employment, salary and salary expected. Write P-6414, Engineering News-Record.

RESIDENT ENGINEER: Duties: The Water Superintendent will be responsible to the Water Commissioner for the operation of the Water Department. Salary: $4,000 per year. Applications will be received until June 1, 1950. Apply to Mayor's Office, Municipal Building, Dover, Delaware.

CIVIL ENGINEER: Graduate, with at least 5 years' experience in design and construction of water supply and sewage treatment plants, with some experience in supervision of construction, available for work in Saudi Arabia. Write, stating experience, salary desired and full particulars, to Box 1-6, Engineering News-Record.

EXPERIENCED ENGINEER to estimate design and construction of water and sewage treatment plants with some experience in supervision of construction, salary open. Reply P-6426, Engineering News-Record.

POSITIONS VACANT

SUPERINTENDENT EXPERIENCED in concrete and all roads and streets. Must be able to handle multiple projects in Metropolitan Area. Give qualifications, references and salary expected. Steady job for right Man. Reply to P-6506, Engineering News-Record.

EMPLOYMENT SERVICE

SALARIED PERSONNEL $3,000-$15,000. This nationally well established 1920 service is geared to needs of high grade men who seek a chance of connection under conditions assuring ill employed full protection to present position. Send name and address only for details. Personal confidential service. Area Thayer Bennett, Dept. E, 11 Orange St., New Haven, Conn.

ENGINEERS, UNIVERSITY Teaching (Civil, Sanitary, Highway, Structures, others). All ranks to Assistant Professor. Address: Chairman, Engineering Staffs, Ohio Teachers Agency, East Lansing, Mich.

POSITIONS WANTED

MECHANICAL SUPERINTENDENT. Twenty-five years experience with erection operation and maintenance of heavy industrial construction and mining equipment. Past six years as Chief Mechanical Engineer for Navy Department. Will go anywhere. Immediately available. PW-6515, Engineering News-Record.

AMBITIOUS CHIEF Accountant, controller. Twenty-five years with leading engineering and construction firms. Knows corporate setups, taxes, insurance, bonding. Experienced in handling large joint ventures and cost plus contracts. Employed but desires change. Reference and bond. Go anywhere. PW-6416, Engineering News-Record.

CONSTRUCTION SUPERINTENDENT. Broad experience in industrial and power plants. Heavy foundation, frame and reinforced concrete. Responsible charge of large operations. PW-6417, Engineering News-Record.

CONSTRUCTION ENGINEER, superintendent, 24 years experience supervising and managing both large and small projects. Competent, reliable, thorough, practical engineer-executive, now employed, desires change. Excavation, industrial and machinery installation. Thorough knowledge estimating and subletting, job supervision, scheduling and progress records. PW-6418, Engineering News-Record.

CIVIL ENGINEERING graduate, 25, single, 3 years experience with consulting Sanitary Engineers, desires connection with firm interested in [illegible]. PW-6421, Engineering News-Record.

CONSTRUCTION MGR. (and Asst. Exec.) [illegible] Salary $12,000 up. PW-6419, Engineering News-Record.

SUPERINTENDENT CONSTRUCTION. 25 years broad experience, commercial, industrial and institutional projects. Employed. Go anywhere. Salary $8,000 up. PW-6417, Engineering News-Record.

(Continued on the opposite page)

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If you are considering a new connection communicate with the undersigned. We offer the extensive personal employment service (40 years recognized standing and reputation). The procedure, at highest ethical standards, is individualized to meet personal requirements and develops interviews without initiative on your part. Your identity covered and present position protected. Send only name and address for details.

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STRUCTURAL ENGINEERING
Thirty-ninth Year
OUR COURSES HAVE HELPED THOUSANDS
to better positions and to pass State Board Examinations

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Monthly payments permissible. Information sent without obligation. WRITE TODAY

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Sales Engineer Available
Executive capacity, currently sales manager for construction equipment concern. Professional engineer, licensed. Wealth of business and technical experience. Superior qualifications.
SA-6547, Engineering News-Record
330 W. 42nd St., New York 18, N. Y.

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PART TIME WORK WANTED

PATENT ATTORNEY

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WANTED
Large engineering firm wishes to acquire several complete plants through purchase of 1) capital stock, 2) assets, 3) machinery and equipment, whole or in part. Personnel retained where possible; strictest confidence.
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AIR COMPRESSORS
VACUUM PUMPS & STEAM BOOSTERS
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All Types of
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Kenmore 1-8000

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Within Reasonable Towing Distance of Albany
W-6131, Engineering News-Record

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Models D8N, D7N, D6N and D4N
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Phone: Laclede 8900, E.D.—5

FOR SALE
ONE COMPLETE
1250 H.P. DIESEL PLANT
First Class Condition. Nordberg Engine, G. E. Generator and all auxiliary units.
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Belton, S. C.

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Equipped with model W210 tournatrailers. Excellent condition. Available immediately. Can be inspected at Belva, W. Va.
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Today more than ever before, you must know how to analyze building costs. If you want to become a successful builder, learn how to prepare a correct estimate in a hurry. Get in on the profitable work now available wherever you turn. Your success is assured if your estimates are right; otherwise you are licked before you start.

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2 NEW 3 c.y. Hercules Aircreter Ready Mix Bodies—$1250.00 each.
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Manitowoc Diesel Powered Speedcranes for rent. 25, 40 and 50 ton capacities with booms 100' or more, 20' and 30' jibs. Special price on long rentals.

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Chain crowd L-41 shovel attachment.
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¾ yd Lorain, 40, LBS ±6105, 44" cutting width, teeth, sheave.
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Lorain 30 hoe attachment.

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Lorain 41, ¾ yd, LBS ±7433, new condition.
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Worthington two-stage, water-cooled, vertical 250±, 60 CFM, new condition.
Ingersoll-Rand 105 cubic foot, Waukesha gasoline power, on two rubber tires.
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New Gardner-Denver 500 cubic foot two-stage water-cooled, D13000 Caterpillar diesel on 4 pneumatics. Used 2 months.

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Cedarapids BBB 1036 Scalper.
18 x 36 Farrell deep jaw crusher.
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60 ton 2 compartment storage bin with clam shell gates.
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Sterling COE Model 255GCS tandem drive tractor, 9.00x24 tires, 200 HP Cummins supercharged diesel, complete with 40 ton Rogers low bed equipment trailer, 16—7.50x20 tires, airbrakes, outriggers, excellent condition.
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Blaw-Knox type SA 10'-15' spreader. New condition.

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Cleveland formgrader, new condition.
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Austin-Western, 5-8 ton tandem.
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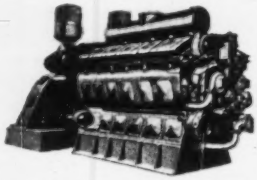

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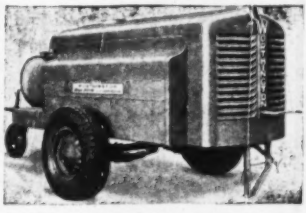

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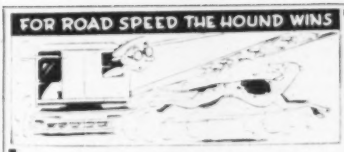

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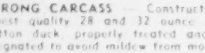

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16"	4	1/8"	1/32"	28 Oz
18"	4	1/8"	1/32"	28 Oz
20"	4	1/8"	1/32"	28 Oz
20"	5	1/8"	1/32"	28 Oz
24"	4	1/8"	1/32"	28 Oz
24"	5	1/8"	1/32"	28 Oz
26"	5	1/8"	1/32"	28 Oz
30"	4	1/8"	1/16"	32 Oz
30"	5	1/8"	1/16"	32 Oz
30"	6	1/8"	1/16"	32 Oz
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NEW-USED RECONDITIONED

Steam, Gas and Electric Power Equipment

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• STRUCTURAL STEEL SHAPES •

New and Used—Immediate Delivery

At present our inventory of steel shapes and forms includes a full line of both new and used steel especially for heavy construction work. 4" I beam to 36" Girder Beam.

BEARING PILE SECTION

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$1.50 Each
P. Post 75¢ within 300 miles of Phila.

U. S. ARMY **5 GAL. JEEP CANS**

COMP. WITH NEW 15" DETACHABLE FLEXIBLE SPOUT

A rugged can for fuel and oil storage for field equipment. Can is used but in good condition. Spout is new with breather pipe and breather tube.

12 Cans	$ 15.00
48 Cans	$ 54.00
100 Cans	$100.00

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The Oldest Equipment House in Philadelphia

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75 UNUSED CRANES

Insleys · Lorains · Byars · Linkbelt
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As Is	Reconditioned
½ Yd. $2500.00	
¾ Yd. 3000.00-4000.00	$4000.00 6000.00

134 NEW

CLAMSHELLS		DRAGLINE BUCKETS	
½ Yd.	$ 600.00	½ Yd.	$300.00
¾ Yd.	700.00	¾ Yd.	400.00
1½ Yd.	1000.00		
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Stanley 72305

REX TRUCK MIXER

4 Yard—TM #407—On Mack
6BX1SH1205

In Good Working Condition $2500

CONCRETE CARRIERS INC.
800 Passaic Ave. East Newark, N. J.

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ALL LATE MODELS

1—N.W. Shovel 2½ c.y. Model 80D
1—N.W. Shovel 1½ c. y. Model 6
5—DW 10's—3000 hrs. or less
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1—Caterpillar D7 Bulldozer

Williams Construction Co.
Box 145, Middle River
Baltimore 20, Md.
Phone—Essex 1310

FOR QUICK SALE

5—Super C Turnapulls with L. P. Scrapers, 45 cu. yd.

2—Super C Turnapulls with 210AW Tournatrailers

1—210AW Tournatrailer unit only

Location — Pennsylvania. Generally good condition. Entire lot offered at very attractive figure.

FS-6016, Engineering News-Record
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HOT ROLLED DEFORMED REINFORCING BARS INTERMEDIATE GRADE

85 tons ¾" Rd. x 25—30'
8 tons ⅞" Rd. x 25—30'
16 tons 1" Rd. x 25—30'
17 tons 1⅛" Sq. x 25—30'
18 tons 1¼" Sq. x 25—30'

$69.00 net ton
f.o.b. Cleveland, Ohio

Phone CEntral 6-1939

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Allis Chalmers Model AD Tandem tires, fully equipped, diesel.

Huber 5 to 8 ton, Tandem, hydraulic steering, gas.

Both in excellent condition and attractive price.

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Dayton 9-5300

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1—1941 TD-9 International Dozer with Bucyrus-Erie Hydraulic Blade. Excellent Condition

1—1945 TD-18 International Dozer with Heil Cable Controlled "Trailbuilder" Angle Blade. This machine is brand new, it has never been used.

1—1950 P & H ¾ yd. Truck Crane, Model 150, 50' boom. Model 150 Clamshell bucket attachment. Very good Condition

1—1941 P & H Gas Shovel, Model 255A, Crawler Type

1—1938 ½ Ton Ford Pickup, Excellent Condition

1—1948 ½ Ton Ford Pickup, Excellent Condition

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Morristown, N. J.

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Rebuilt Current Models

For Sale or Rent

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ONE (1) 34 E DUAL DRUM KOEHRING PAVER

New, Never Used. Sacrifice price.

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READY MIXED CONCRETE PLANT

1 Complete READY MIXED CONCRETE PLANT—Blaw Knox Including the following: 800 barrel bulk cement bin, 100 ton per hour bucket elevator with unloading screw for handling bulk cement; Model 84 S. Ransome Mixer (less than 2 years old); 100 ton three compartment aggregate bin complete with cement and aggregate weighing batchers; electric powered gantry and whirley for charging bins, with 2 cu. yd. Clamshell Bucket. Plant in daily operation and can be inspected in the Philadelphia district. Offered subject to prior sale or commitment.

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Phone Williams 1-8600
Hillsgrove, Rhode Island

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24—Exide locomotive type TLM27 60 cells 120 volts, new in 1942-43; some never used. New price $6200 ea. Will sell for $3400.00 ea. with box, guaranteed.

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New Guaranteed . . . 60 TON

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Michigan TLDT20, 95' Boom, 15' Jib. Like New. Used on Steel Erection Work only. $13,500.00 FOB Abilene, Texas.

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PORTABLE MULTI USE POWER SAW

SAVE $300

WAS $488.00

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America's greatest saw bargain! Cuts lumber to 4" thick. Briggs & Stratton 5½ H.P. gas engine. Saw cuts flue lining, transite pipes, steel sheets, copper & aluminum, etc. Does work of $1,000 worth of saw equipment. Sharpens tools. Famous make, brand new, original crates. Limited supply. Send for literature. DEPT. ENS

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SHOVELS & CRANES

1—Northwest Model 7(D—2 yd. diesel shovel
2—Northwest Model —shovel and crane
2—Northwest Model 25—crawler crane, shovel, Pullshovel
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We do a Nation-Wide business in

STEEL SHEET PILING

New & Used — Rented & Sold

100 pcs. 30 ft. Beth. APS Buffalo
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Other lengths & sections at various locations

All sizes Vulcan & McKiernan Pile Hammers & Extractors for Rent and Sale—Shop Rebuilt

Regardless of location of your job write or write

MISSISSIPPI VALLEY EQUIPMENT CO.

509 Locust St., St. Louis, Mo.

WE BUY STEEL PILING FOR CASH

SHEET PILING

Location—Birmingham, Ala.

163 Pcs. SP6a 14 to 17 feet
60 Pcs. SP6A 11 to 14 feet
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21 SP6A Corners
62 SP7A Corners

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INDUSTRIAL RUBBER PRODUCTS FOR EVERY PURPOSE

IMMEDIATE DELIVERY OF COMMERCIAL GRADE RUBBER AND FABRIC MANUFACTURING BELTING FIRE HOSE SUCTION, A.R. STEAM AND WELL HOSE

SUCTION HOSE

Stock No. CO-111

Heavy duty, smooth bore, wire inserted Suction Hose. Flexible and strong for use in mines, sewers, trenches, etc. with diaphragm pumps, pressure pumps and other contractors equipment. Prices shown include I.P.T. Couplings attached to each length.

Size	Price Per Length	Length
1"	$1.25	$40.00
1½"	.75	19.50
2"	4.00	65.50
2½"	6.00	70.00
3"	8.00	82.50
4"	5.00	55.00
5"	6.50	87.50
6"	18.75	
8"	24.25	

DISCHARGE HOSE

Stock No. CO-112

Cotton jacket, rubber lined hose suitable for water supply and discharge service. Constructed exactly like Fire Department Light in weight. For pressures to 200 lbs. Attached to each length are Iron Pipe Thread Couplings.

Size Inside Diameter	Price Per Length	Price Per Length	Price Per Length
	25 ft.	50 ft.	100 ft.
1"	$6.00	$8.00	$15.00
1½"	11.00	14.00	26.00
2"	14.50	18.00	34.00
3"	16.00	20.00	36.00

HIGH PRESSURE HOSE

Stock No. CO-88

2½" x 4 PLY DUCK AND CORD CONSTRUCTION SUITABLE FOR 400 LBS. WORKING PRESSURE

For that difficult job where high pressures are encountered Carlyle offers this rugged fire hose saving you over 50% in cost and giving dependable service for the following jobs:

Jetting—Water, Air, Cement
Hydraulic Grout
Steam to 400 lbs. Pressure
Oil Discharge

Low Priced at 25¢ ft.

Available in 10-15-20-25-30-50 ft. lengths. High Pressure Couplings attached as follows:

	Price Per Length
Size A Male	$10.00
Female & Male	12.00
Female & Female	16.00

COMPRESSOR AIR HOSE

Stock No. CO-111

250 Lbs. Working Pressure. Heavy duty extremely flexible Pneumatic Air Hose. For all Air Tools, Compressors, Chippers, Riveters, Drills and Breakers. Each length supplied with Universal Air Hose Couplings attached. These couplings are quick soap and interchangeable with Air King, Chicago, Cleveland and others.

Size and Length	Price Per Length
	$ 7.25
	15.00
	5.75
	16.00
	18.50
	19.50

...over stocked. Drastically reduced prices to move.

Terms: F.O.B. N. Y. City 2% 10 days.

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Phone: Digby 9-3810

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WROUGHT Steel Pipe

FITTINGS
VALVES
BOILER
TUBES

ALBERT & DAVIDSON PIPE CORPORATION

2nd AVENUE 50th-51st STREET

BROOKLYN 32, N. Y.

Windsor 9-6300

For Sale or Rent

STEEL SHEET PILING

Bethlehem SP-4 section

First class redrivable

102 Pcs. 42 to 39 ft.
249 Pcs. 37 to 34 ft.
932 Pcs. 33 to 30 ft.
575 Pcs. 29 to 26 ft.
586 Pcs. 24 to 20 ft.

Also Ten Pieces

IMMEDIATE SHIPMENT from southeast

MISSISSIPPI VALLEY EQUIPMENT CO.

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VALVES and FITTINGS

All Sizes in Stock

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INTERLOCKING STEEL SHEET PILING

All lengths & strengths RENT or BUY

LEBOURGEOIS CO.

Pittsburgh 30 New York 7 Chicago 4 Houston 2

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Metcalf & Eddy

Gustave M. Goldsmith

Albright & Friel, Inc.

Consoer, Townsend & Associates

The Haller Testing Laboratories, Inc.

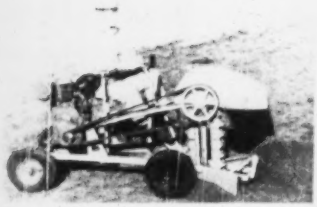
Jones, Henry & Schoonmaker

Frederick H. Dechant

NEW PRODUCTS

Attachment Converts Standard Unit to Elevating Grader

Donor attachment quickly converts standard Caterpillar grader into a one-man self-propelled elevating grader. In making conversion, the standard blade, tandem, and drawbar are removed and the elevating carrier adjustably supported under the main frame. A 30-in disk plow is drawn by plow beam attached to standard draw bar connections. The 42-in carrier is driven by a power take-off and has a normal speed of 400 rpm. It is equipped with a 4-ply corrugated top conveyor belt. An auger-type pan cleaner is gear driven. The standard auger is 19 ft in length. For casting work, a 3-ft section can be removed. Carrier lift is operated by cables powered by regular blade controls. Upper end of carrier is lifted by the right-hand blade control, while the lower end is connected to the blade sideshift control. Ulrich Products Corp., Roanoke, Ill.

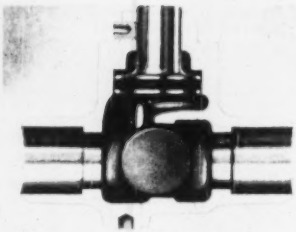


Midget-Size Trencher

Light-duty trencher digs a 4-in-wide ditch to a maximum depth of 30 in. By making multiple cuts, the DitchWitch can prepare trenches of any width for large-diameter pipes. Digging mechanism is hydraulically raised and lowered. Spoil is deposited on either side of trench by the spoil chute. An adjustable scraper follows digger to provide a clean-cut ditch. It has a loaded ratchet type digger. Charles S. Machine Works, Perry, Okla.

Pick-Up to Dump-Truck Kit

Conversion unit for changing standard pick-ups into dump trucks consists of pedestal, hydraulic hoist conversion kit, the Connecto-Coupler for dump body, power take-off for dump body, and the vertical-hydraulic hoist. As no power take-off is required, unit can be operated manually from any location on the truck or driven electrically from a cab-controlled Blackhawk pump. Lifting capacity of the spool is 6,000 lb. Connecto Mfg. Co., Cambridge City, Ind.



Bronze Balancing Valve

Positive, leak-tight shutoff and adjustable flow in a single valve are features of the Equitemp bronze balancing valve for hot-water radiant-heating systems. Closing and balancing actions are accomplished by a butterfly-type disk fitted with a composition-rubber O-ring. The valve is designed to accommodate any of several standard venting attachments. A well drilled into the stem provides a handy method for taking temperature readings. Ohio Brass Co., Mansfield, Ohio.

Highway Patrol Pull Grader

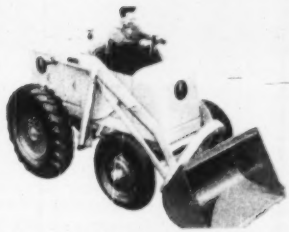
Small pull grader has an 8-ft blade, 4 scale ranges of adjustments, and is constructed for rugged use. The No. 4 HeWas Patrol has an adjustable rear axle and tractor pole, and may be pulled by track or wheel-type tractor, truck, or team of horses. Flat-spoke or rubber-tired wheels are optional. Information may be obtained from dealers of the Caterpillar Tractor Co., or —Preco, Inc., 6300 E. Stanton Ave., Los Angeles 22, Calif.

Sectional Scaffolding

Basic unit employed in Bobst scaffolding is a sectional ladder with spaced ladder rungs designed as load-bearing members. Rungs are spaced 14 in. apart and the ladder sections are made 12 in. wide and 5 ft 10 in. high. Welded pilot plugs are used at the top of each sectional ladder so that each section is super-imposed one upon the other and all are anchored together in true alignment. Ladders are cross braced rigidly. Putlog trusses connect the ladders together transversely and these can be assembled for any type of service. The Bobst ladder-type scaffolding can also be used for shoring.—W. E. M. Mfg. Co., Ripon, Wis.

Admix Meter for Pavers

Metering device automatically measures a predetermined quantity of liquid air-entraining agent into concrete batch. It is designed for use on Koehring 16-E or 34-E Two-batch Pavers, and is also suitable for use in connection with water batchers in ready-mix or central-mix plants. Entirely mechanical, movement of the paver skip actuates the meter.—Koehring Co., 3026 W. Concordia Ave., Milwaukee 10, Wis.



Half-Yard Tractor Shovel

Payloader tractor shovel is now available in a ½-yd size. The HE features full-reversing transmission, hydraulic brakes, full dumping clearance of 91 in., and hydraulic dumping. It can be used to dig, load trucks, grade, level, backfill, spread, and transport all types of materials. The Frank G. Hough Co., 852 Sunnyside Ave., Libertyville, Ill.

Air Line Filter

Filter provides clean air essential to peak performance of air-powered tools.

(Continued on page 124)

ANNOUNCING THE

MARION 43-M

AN *ALL-PURPOSE 1 CU. YD.* MACHINE

18½ TON CRANE

1 CU. YD. DRAGLINE

PILE DRIVER

39" BACKHOE

1 CU. YD. SHOVEL

MARION POWER SHOVEL CO.
MARION, OHIO, U. S. A.

OFFICES AND WAREHOUSES IN ALL PRINCIPAL CITIES

from 3/4 cu. yd. to 45 cu. yds.

Hendrick Shur-Site Treads —for stairs, ladders, fire escapes

provide all the advantages of Hendrick Mitco Open Steel Flooring—square-edge, uniformly spaced bars that afford a non-slipping, level walking surface; minimum interference with light because of 90% open area; no obstruction to ventilation; strength and rigidity that insures long service.

A conspicuous, heavy flanged nosing-bar at edge of each tread—a valuable safety feature—also provides reinforcement where load is greatest. Write for Hendrick Mitco Products catalogue.

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45 DUNDAFF STREET, CARBONDALE, PENNA.

Sales Offices In Principal Cities

Perforated Metals
Perforated Metal Screens
Architectural Grilles
Mitco Open Steel Flooring,
"Shur-Site" Treads and
Armorgrids

MORE WORK PER MAN PER DAY with this SANITARY CONVENIENCE

New PARCO

INSULATED WATER CARRIER and Cup Dispenser

Many sanitary features are built into this outstanding cool water dispenser—constructed with stainless steel interior.

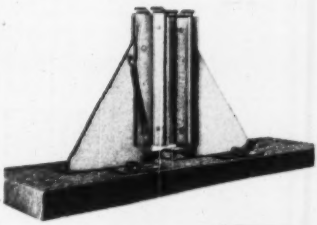
Greater labor efficiency is yours by placing this dispenser at a convenient location, or the unit can be carried to men on the job. For additional information and prices, write today.

TERRITORIES OPEN - DISTRIBUTORS WANTED

Parco Products Company

EAST GREENVILLE PENNSYLVANIA

The porous, sintered-bronze filter element, filters all particles of dust, dirt, grit, or scale down to 0.001 in. A series of baffles trap condensation and moisture in a sump pump from which accumulated water can be removed through a drain cock. Filter has a rated capacity of 40 cfm. Filter element is cleanable.—KELLER TOOL CO., GRAND HAVEN, MICH.



Upright Vise for Large Pieces

Heavy doors, windows, plywood sheets, and similar flat, large objects are easily worked upon when held securely by the Drop Klamp. The edge of any flat object is slipped into the clamp and is held firmly by the weight of the object. A fiberboard liner prevents marring of polished surfaces.—LAKESHORE MFG. CO., 425 P 2ND AVE., SO., MINNEAPOLIS 1, MINN.

New Product Briefs

Speed clip for fastening insulation, asphalt shingles, rolled roofing, and plasterboard to wood surfaces has a broad, flat head which simplifies driving and affords a large surface for maximum holding. Barb on each side of the taper prevents loosening. Speed Clip (Zimmerman Products, Inc., Cleveland, Ohio) is produced for insulation 1 in. thick.

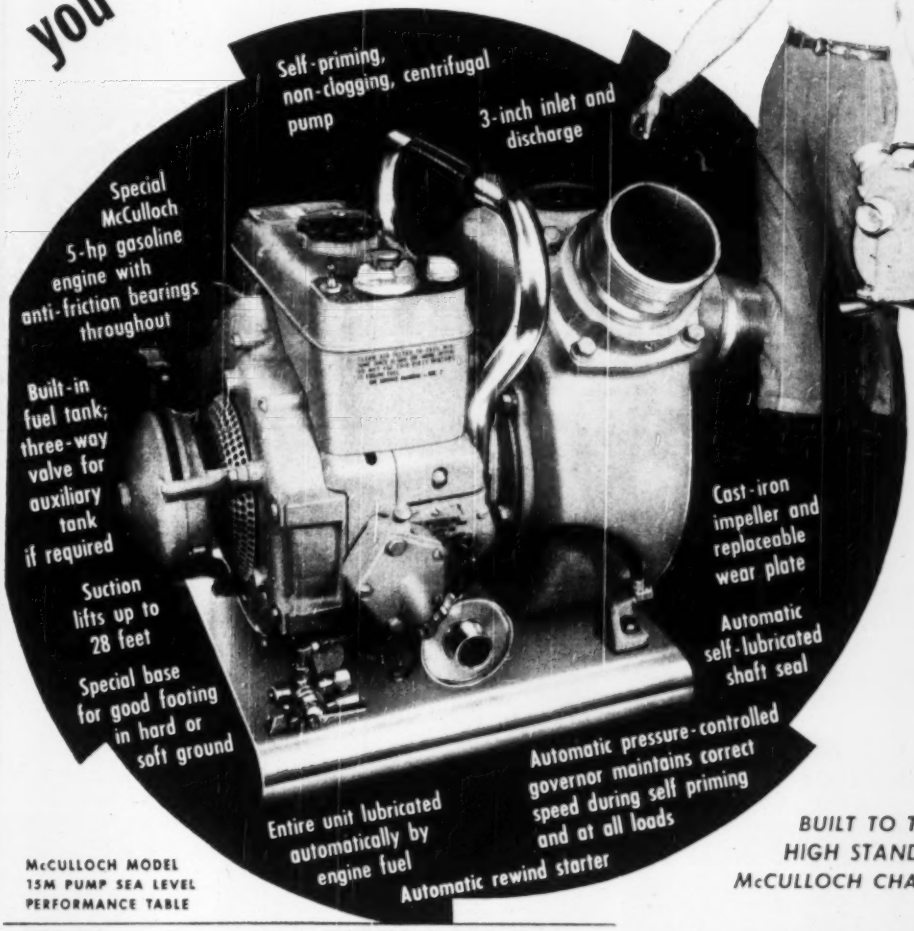
Colorless silicone product has high penetrating properties providing (concrete, masonry, cement blocks, brick, etc.) protection against moisture and water. Invisible Rainchek is produced by Protection Products Mfg. Co., Kalamazoo, Mich.

Solid wood platform (15x20 in.) is designed for hanging from rungs on ladders. Can be used as a step, seat, tool hanger, tool rack, and similar uses. Maker: San Francisco Scaffolding Co., San Francisco 24, Calif.

Puncture proof safety innersole is designed to fit into any conventional work boot or shoe. It consists of a top grade leather innersole, special spring steel plate, and rubber fortified cotton duck bonded together under heavy pressure. Maker: Rubber Hide Co., Inc., Trenton 4, N. J.

Here's a 15,000 GPH Pump you can carry in one hand!

Engine and pump together weigh only 57 pounds


Self-priming, non-clogging, centrifugal pump
3-inch inlet and discharge
Special McCulloch 5-hp gasoline engine with anti-friction bearings throughout
Built-in fuel tank; three-way valve for auxiliary tank if required
Suction lifts up to 28 feet
Special base for good footing in hard or soft ground
Cast-iron impeller and replaceable wear plate
Automatic self-lubricated shaft seal
Automatic pressure-controlled governor maintains correct speed during self priming and at all loads
Entire unit lubricated automatically by engine fuel
Automatic rewind starter

BUILT TO THE SAME HIGH STANDARDS AS McCULLOCH CHAIN SAWS

McCULLOCH MODEL 15M PUMP SEA LEVEL PERFORMANCE TABLE

TOTAL HEAD INCLUDING FRICTION	HEIGHT OF PUMP ABOVE WATER 10 Ft.	15 Ft.	20 Ft.	25 Ft.
20 ft.	250 GPM			
25 ft.	245	210 GPM	170 GPM	
30 ft.	235	205	165	130 GPM
40 ft.	215	190	160	125
50 ft.	185	165	145	120
60 ft.	135	130	125	105
70 ft.	65	65	65	60

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CORPORATION
Los Angeles 45, California
Export Department: 301 Clay St., San Francisco 11, California, U. S. A.

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Please send me complete details on the McCulloch Model 15M Pump.

Name _____

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City _____ Zone ____ State _____

Need STEEL SHEET Piling?

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ONE TON OR A THOUSAND

The exact length and exact section of piling that the job requires—exactly when you need it, and at minimum cost . . . that's what you get when Foster services your piling requirements. And Foster Rates on all standard piling sections give you a low fixed expense, providing an added competitive advantage when you bid on jobs. Try us, whatever your needs, you can count on an exacting, prompt service on all sections and makes for ANY job. Remember too—FOSTER GUARANTEES: All material rigidly inspected before shipment. If on your inspection it is not exactly as represented, it is returnable, freight both ways at our expense.

Send Today for New Free Piling Reference Wall Chart FP-2.

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Manufacturers' Publications

Central-Station Air Conditioners—Low-height air conditioners in capacities from 7,000 to 20,000 cfm are described in 12-p Bulletin No. 6. These central-station units can be floor mounted or suspended from the ceiling. The bulletin describes features of various units in the line and contains complete specifications for each. —BUENSOD-STACEY, INC., 60 E. 42ND ST., NEW YORK 17, N. Y.

Plastic Cement—Detailed recommendations for mixing and application of Calaveras plastic cement are listed in this pocket-size pamphlet. Six advantages listed are: Greater sand-carrying capacity, unequalled plasticity, accurate control, greater mortar strength, resistance to shrinkage cracks, and unmatched durability.—CALAVERAS CEMENT CO., 315 MONTGOMERY ST., SAN FRANCISCO 4, CALIF.

Rubber Conveyor Belting—Installation, care, and maintenance of rubber conveyor belting are described in this pamphlet. Subjects covered include splicing, cold-patch and heat-vulcanized minor repairs, all types of major repairs, and other important phases of conveyor repairs.—CARLYLE RUBBER CO., INC., 64 PARK PLACE, NEW YORK 7, N. Y.

Abrasion-Resistant Alloy—The uses and advantages of Thermalloy HC-250 are listed in 6-p folder. Feature of the folder is a description of the physical properties of this abrasion-resistant material. Several case histories describing the metal in actual field service are another feature of Bulletin E-176. The bulletin also contains information on the microstructure of HC-250, how it is supplied, facts on distortion, its machinability, and cost per operating hour.—AMERICAN BRAKE SHOE CO., ELECTRO-ALLOYS DIVISION, 230 PARK AVE., NEW YORK 17, N. Y.

Linear Conversion Table—Reference table lists conversion of inches and fractions into decimal parts of a foot. Known as EDC 110, the table is arranged on a single card and is available free.—THE BABCOCK & WILCOX TUBE CO., BEAVER FALLS, PA.

Clarifiers, Sludge Collectors—Circular collectors for clarification, sedimentation, and sludge collection are described

(Continued on page 130)

Quaker State stabilized Quadrolube

is especially made for transmis-
sions and rear axles, except hypoids. It is exceptionally resistant to pressure and heat.*

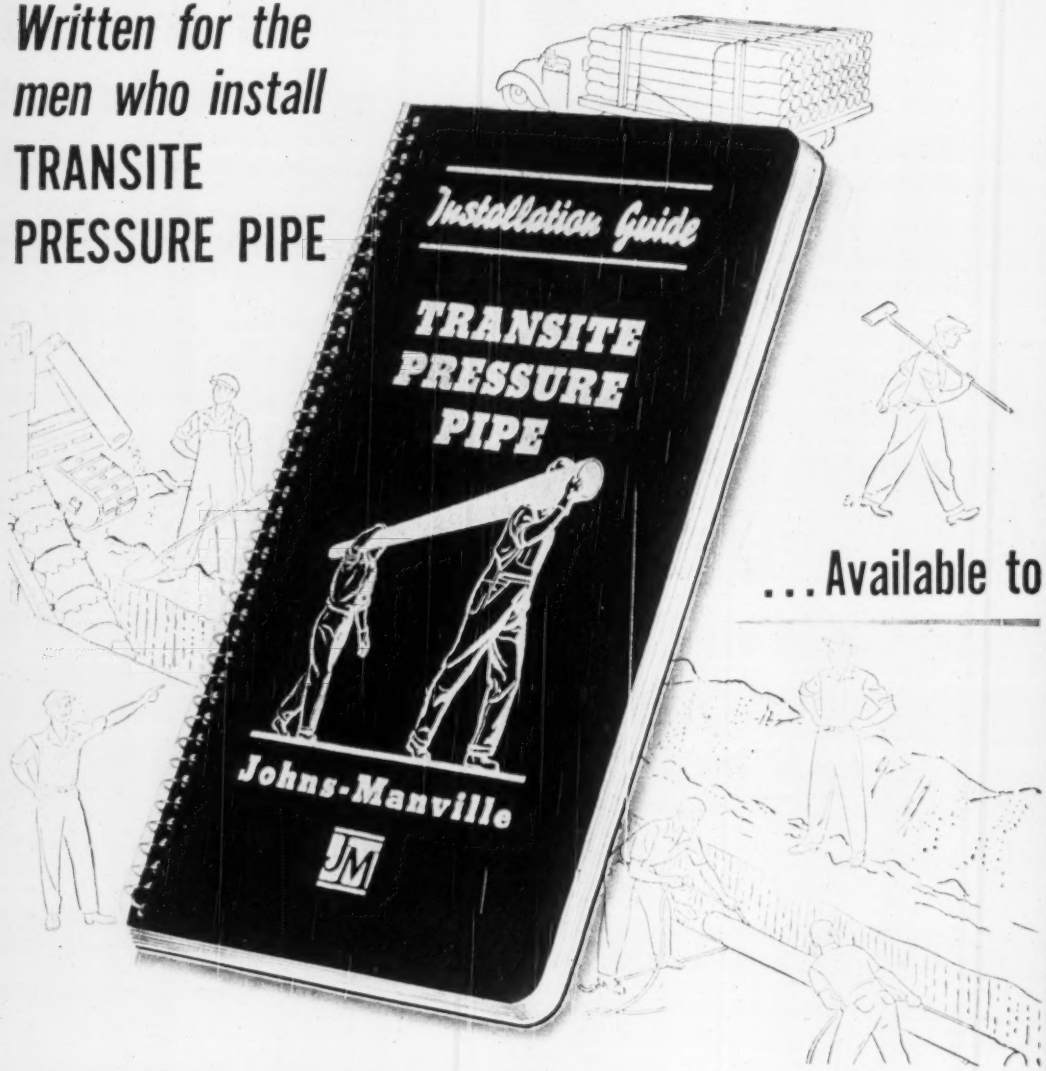
Quaker State Waterproof Lubricant — Quaker State EXPT2 Lubricant — Quaker State Viscous Lubricant — Quaker State Super Quadrolube — Quaker State Quadrolube — Quaker State Wheel Bearing Lubricant — Quaker State Universal Joint Lubricant

QUAKER STATE QUADROLUBE embodies all the unparalleled qualities of 100% pure Pennsylvania base oil. It resists not only pressure and heat to a remarkable degree, but it also resists cold, moisture, rust, corrosion and foaming.

To help keep your equipment rolling at its best, give it *complete* Quaker State Lubrication Service.

*For hypoids, use Quaker State Super Quadrolube.

Written for the men who install TRANSITE PRESSURE PIPE



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As its title implies, this new Installation Guide was designed especially for those who do the actual work of installing Transite* Pressure Pipe . . . a handy working tool intended to help the man in the field do a good job in an economical way.

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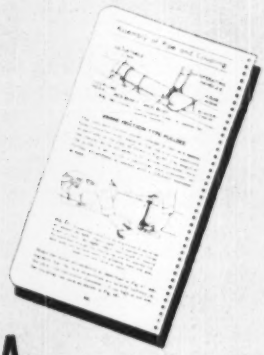
Q. *How is Transite Pipe assembled in the trench?*



A. By means of the Simplex Coupling, a factory-made joint. See page 38.

Q. *How are joints checked for correct assembly in advance of leakage tests?*

A. By the use of a simple feeler gage as described on page 50.

Q. *Are standard practices used for making joints at fittings?*

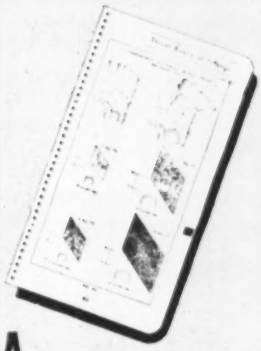
A. Yes—see "Making Joints at Fittings" page 78.

anyone who wants the answers to questions like these

Q. *Can you cut, machine and tap Transite Pipe in the field?*

A. Yes—see "Cutting Transite Pipe" page 72 and "Service Connections" page 91.

Q. *How are size and type of thrust blocks at fittings determined?*



A. The Guide gives helpful data, including tables, construction, and location. See page 82.

Q. *What about trench preparation, supporting the pipe, and tamping?*

A. Standard methods are employed. See pages 16, 23 and 97

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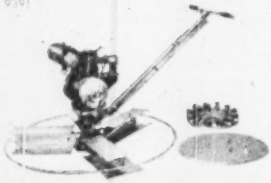

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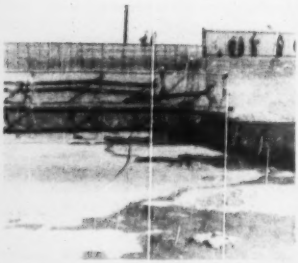

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(Continued on page 133)

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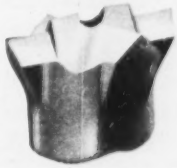

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tex R-103-S insulation hardboard for low-temperature insulation. Bulletin describes construction of this material — an expanded rubber compound, made of synthetic stocks. It will not absorb moisture and may be used without an added vapor barrier. K factor is 0.21.—GREAT AMERICAN INDUSTRIES, INC., ROBATEX DIVISION, BEDFORD, VA.

Building-Moving Facilities — History and facilities of a company concerned with moving an assortment of structures is reviewed in a catalog entitled, Moving With the E. W. La Plante Co. Feature of the catalog is a description of several typical projects involving the moving of large buildings, homes, city blocks and water towers.—E. W. LAPLANTE CO., 2525 E. 46TH ST., INDIANAPOLIS, IND.

Hydraulic Cylinders — New Ledeen catalogs are available describing the use and construction of pneumatic and hydraulic actuating cylinders. Bulletin CS-248 describes the use of these cylinders for removal of mold cores from fresh concrete pipe during production. Bulletin 500 lists dimensions and weights, ratings, and limitations of the Ledeen medium, heavy, and super duty lines.—LEDEEN MFG. CO., 1600 S. SAN PEDRO ST., LOS ANGELES 15, CALIF.

Suspended Acoustical Ceilings — Brochure (8 pp.) describes AcoustiLine system of suspended acoustical ceiling construction. Drawings in the catalog show various parts of the system and how they clip together. Photographs of actual installations show how the ceiling is adapted to various types of lighting fixtures.— THE CELOTEX CORP., 120 S. LASALLE ST., CHICAGO 3, ILL.

Six-Wheelers—Tandem drive units for all types of 6-wheelers are described in a booklet prepared by Timken Detroit. The bulletin lists the types of 6-wheelers, and types and design features of Timken Detroit tandem drive units. The bulletin is replete with photographs and drawings used to illustrate the text matter.— TIMKEN-DETROIT AXLE CO., 100 CLARK, DETROIT 32, MICH.

Portable Power Tools—New Thor catalogs include Circular JJ-1145 on Thor Copper Line tools including ½ and ¾-in. drills; Circular JJ-1139 on the Model 35 make rock drill; and Circular JJ-1132 on fuel-burning tools including a new swivel leg, an air hot head, a pneumatic calking, and a stoper leg.—INDEPENDENT PNEUMATIC TOOL CO., 175 STATE ST., AURORA, ILL.

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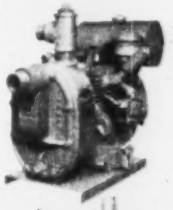

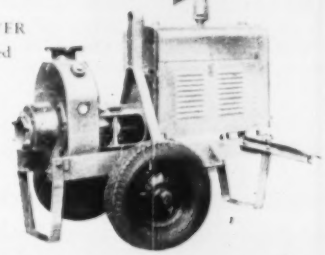

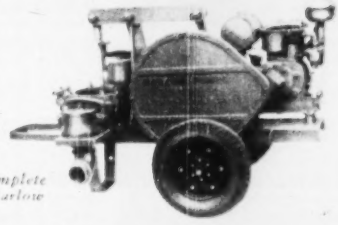

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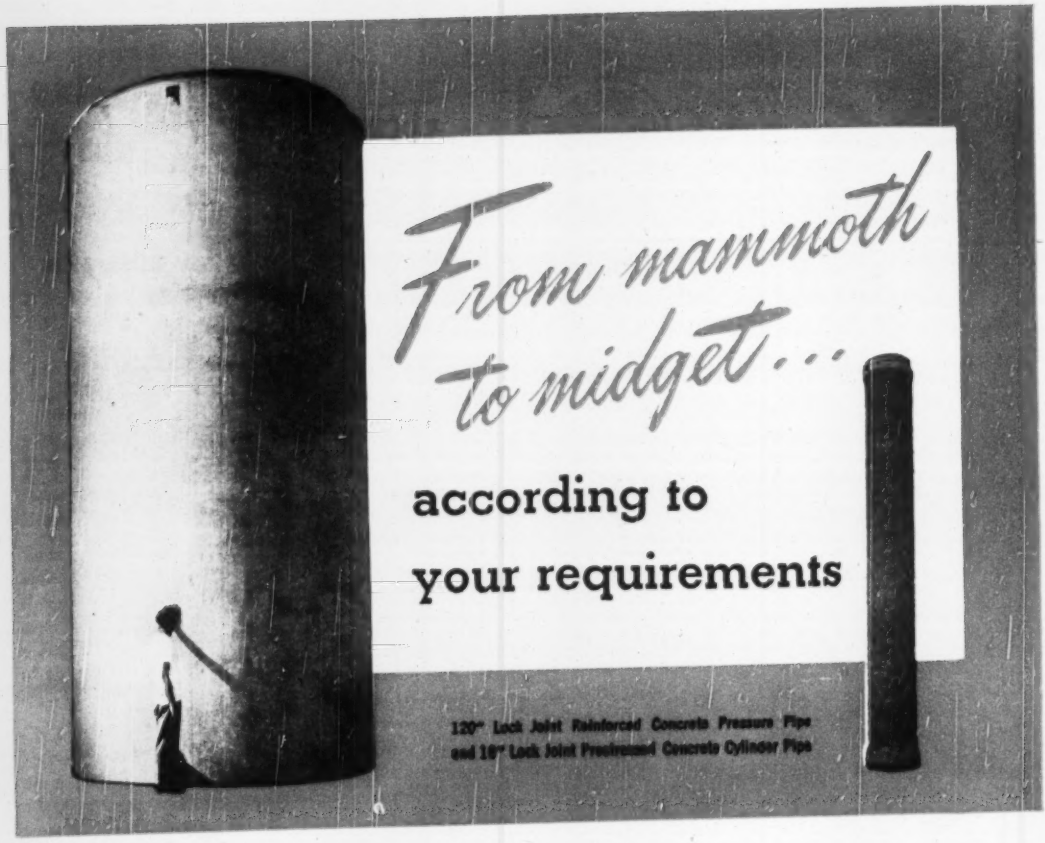
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ADVERTISERS IN THIS ISSUE

Acker Drill Co. 64
Allis Chalmers Mfg. Co. 6 & 7
Aluminum Construction Ltd. 88
American Bridge Co. 74 & 75
American Cyanamid Co. 88
Arkwright Finishing Co. 48
Atlantic Steel Corp. 94
Atlas Powder Co. 55
Austin-Western Co. 66

Barco Mfg. Co. 69
Belmont Iron Works 90
Berger & Sons, Inc., C. L. 2
Bethlehem Steel Co. 82
Buchanan Lumber Co. 135
Byers Co., A. M. 2nd cover

Cement Gun Co. 130
Chapman Valve & Mfg. Co. 59
Cities Service Companies 10
Clearprint Paper Co. 75
Complete Machinery & Equipment Co. 93

Deister Machine Co. 53
Deming Co., The 63
Detroit Diesel Engine Div., General Mo. Corp. 132
Dow Chemical Co. 13

Eagle Crusher Co. 92
Electric Steel Foundry 91
Electric Tamper & Equipment Co. 90
Eppinger & Russell Co. 101

Foster Co., L. B. 126
Four Wheel Drive Auto Co. 81

Galion Allsteel Body Co. 87
General Excavator Co., The 98
Gilson Screen Co. 90
Golden-Anderson Valve Spec. Co. 4
Goodyear Tire & Rubber Co. 100
Grace Mfg. Co., W. R. 103
Grasselli Chemicals Dept., E. I. duPont de Nemours & Co., Inc. 58
Griffin Wellpoint Corp. 100
Gunite Concrete & Const. Co. 96
Gunite Construction Co. 86

Harnischfeger Corp. 56
Heltzel Steel Form & Iron Co. 11
Hendrick Mfg. Co. 124

Independent Pneumatic Tool Co. 83
Industrial Brownhoist Corp. 67
Inland Steel Co. 14
International Harvester Co. 95

Johns-Manville Corp. 128 & 129
Joy Mfg. Co. 15

Kinnear Mfg. Co. 8

Laclede Steel Co. 12
Layne & Bowler, Inc. 72
Lima Electric Co. 70
Lock Joint Pipe Co. 144
Lukens Steel Co. 14

Macwhyte Co. 4
Marion Power Shovel Co. 123
Marlow Pumps 133
Master Builders Co. 3rd cover
Master Vibrator Co. 130
McCulloch Motors Corp. 127
McGraw-Hill Book Co. 142
McKissick Tower Co. 87
Mayo Tunnel Equipment Co. 103
Metalliding Engineering Co., Inc. 85
Mixermobile Mfg. Co. 89
Morris Machine Works 71
Mott Core Drilling Co. 135

Naylor Pipe Co. 97
Newman Brothers, Inc. 133
Northwest Engineering Co. 60
Nott Engine Co. 96

Ohio Locomotive Crane Co. 131
Oman & Sons, Inc., D. W. 100
Osgood Co. 98

Parish Products Co. 104
Pennsylvania Drilling Co. 95
Pittsburgh-Des Moines Steel Co. 93
Portland Cement Association 78
Pressure Concrete Co. 100

Quaker State Oil Refining Corp. 127

Raymond Concrete Pile Corp. 21
Riddell Co., W. A. 84
Roebling & Sons Co., John A. 9
Russell Bradsaft & Ward Bolt & Nut Co. 83
Ryerson & Son, Inc., Joseph T. 101

Sauerman Bros., Inc. 95
Schramm, Inc. 104
Sisalkraft Co. 46
Spencer, White & Prentis 100
Sprague & Henwood, Inc. 100
Standard Oil of Calif. 52
Stang Corp., John W. 98

Texas Co. 4th cover
Thew Shovel Co. 12
Timber Engineering Co. 86
Timber Structures, Inc. 84
Timken Roller Bearing Co. 131
Tinney Drilling Co. 102
Torrington Co., The 61
Trailer Village, Inc. 94
Truscon Steel Co. 69
Tute Turns, Inc. 56 & 57
Twin Disc Clutch Co. 92

Underpinning & Foundation Co. 96
U. S. Pipe & Foundry Co. 85
U. S. Steel Subsidiaries 22, 74 & 75
United Steel Fabricators, Inc. 74
Universal Atlas Cement 22
Universal Mfg. Co. 133
Universal Sewer Pipe Corp. 20

Vacuum Concrete Inc. 97
Vulcan Iron Works 102

Wenman Pump Mfg. Co. 98
Western Waterproofing Co. 94
Wheeling Corrugating Co. 49
Williams Co., J. H. 90
Wood & Co., R. D. 5
Woodbridge Mfg. Co. 15

Zanesline Co. 91

Professional Services 121

SEARCHLIGHT SECTION

(Classified Advertising)

Employment
Positions Vacant 112
Civil Service 112
Positions Wanted 112, 113
Part Time Work 113
Selling Opportunities Wanted 113
Employment Agencies 112
Employment Services 112

Special Services
Contract Work 113

Educational
Schools 113
Tutoring 113

Business Opportunities
Offered 113

Notices
Proposal 108, 111

Property
Wanted 113

Equipment
Used or Surplus New
For Rent 114
For Sale 114, 123
Pumps 114
Pipe 114
Rail 114
Surveying Instruments 114

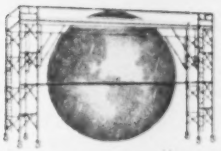
Wanted
Equipment 114
Miscellaneous 114

ADVERTISERS INDEX 110

ENGINEERING NEWS-RECORD

Business Manager — Sales Manager

Sales Representatives



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Letter from . . .

NORTH CAROLINA

North Carolina's $200-million experiment in putting an all-weather surface on every rural road in the state already looks as though it might pay out. Involving upwards of 50,000 miles it's no test-tube trial.

Gov. W. Kerr Scott and his associates promoted the program primarily on two counts: A year-round road to market for practically every farm and routes the rural school buses could travel without interruption.

Only about 5 percent of the $200 million has been spent since work began last September. From this limited experience, backed by years of previous experience, it's evident that Governor Scott's ideas on farm-to-market and school bus roads are sound.

But two other developments are resulting that are of at least as great importance. Financially, they are far more so.

One of these is a market for land along the newly improved roads for which formerly there was almost no demand.

The other is that the all-weather rural roads tap great reservoirs of labor for North Carolina's industries.

Should these two unforeseen developments continue, as expenditures increase, then the state apparently will find the 50,000-mile experiment a most profitable investment.

With a population of about 4,000,000 North Carolina is basically a rural state. Charlotte, its largest city, has only about 130,000 people. North Carolina's industries, largely in the western half of the state, are mainly in small cities and towns. Their employees live in the country to an extent unknown in the more states. Many drive 15 to 20 miles into town.

Rural homes of these industrial employees are bright along the primary highways, inside of small farms high in acreage value. They have stuck to the primary highways to be sure they could get to work. Now they are beginning to spill over onto the newly improved rural roads, where land values have been much lower.

Highways are a tool. North Carolina earned a reputation for taking big chances on highway investment when it tackled its first primary program back in 1920. Although the state then was quite poor, a $50 million bond issue for highway construction was voted. Ultimately, $115 million in bonds were sold.

These seemed staggering figures for a state with little wealth. Since then, North Carolina has shown great progress, due at least in part to its courageous venture into highways. Now, the $200 million experiment on rural roads is, in proportion, much less of a burden. In fact, the only increased cost to it's people is a raise from 6 to 7 cents in the state's tax on gasoline.

State handling of rural roads also is not new in North Carolina. Back in 1931, the state took over the construction and maintenance of all rural roads. Since then, the state has been entirely responsible for all roads.

Up from the dirt. Under this set-up, North Carolina had done quite a bit of all-weather surfacing on rural roads. But many thousands of school bus routes were impassable at times. Other thousands of rural roads are just plain dirt.

North Carolina transports a very large percentage of its rural children to consolidated schools. There are practically no single-teacher schools left in the state. Very few have less than twenty teachers. Some rural counties are building a single central high school.

These conditions were the main keys for Governor Scott's rural road program. Opposition from the cities and towns was strong. But the Governor is a dairy farmer, who was for 12 years commissioner of the state's department of agriculture. He knew that about 75 percent of the state's population lives in towns of less than 2,500 people, and in the country. His campaign resulted in a big victory for the $200 million issue.

Conditions vary. In putting an all-weather surface on these roads, a wide variety of conditions must be met. The state's eastern third is a flat coastal plain. Great areas are little above sea level. The western third has the highest mountains east of the Mississippi. Differing soils, climate and other controlling factors call for different plans and methods.

Experience since 1931 gave the engineers of the State Highway Commission the know-how. The vast new program is merely an expansion of operations.

An unusually open winter followed the start of the program. Work kept going with little interruption. With spring, the commission was set to improve much more mileage this year than seemed possible a year ago.

Most of the work is in bits and pieces, practically all of it single lane. Such projects are handled largely by force account, directed by commission engineers.

Saving on paving. Some 12,000 miles of the state's rural roads carry enough traffic that the program provides they may be paved. In most cases a 16-foot width, particularly in the mountains. There, an average of twice the mileage may be paved to that width, due to the heavy cost of widening to 16 feet.

Wherever practical, the paving is being done under contract. Crushed stone and crushed gravel also are bought directly from private producers.

Between 1937-38 and 1947, traffic on rural roads in North Carolina increased an average of 70 percent. The belief is that the next decade's rate of increase will be much higher.

One main criticism of the $200 million experiment has been that it would lead to neglect of the primary system. But the commission shows figures that:

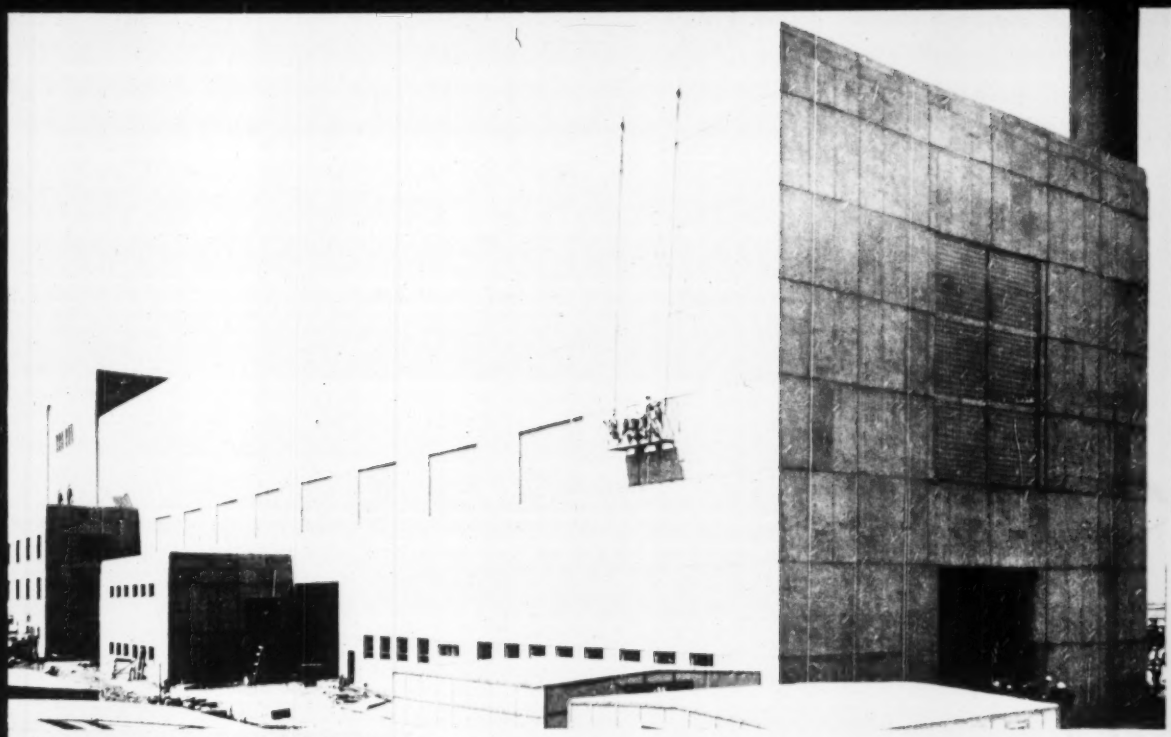
1. Prove the income from the state's gas tax will be sufficient to service the big bond issues and

2. Leave ample funds to continue to improve and maintain the primary system at least as effectively as in the years since the war.

These figures are based on current traffic.

North Carolina recently found a quick sale for two issues of bonds out of the $200 million the voters authorized. The first issue, of $50 million went at 1.57 percent interest. A second $75 million did even better at 1.52 percent.

These interest rates are a little more than one-quarter the average interest the state paid for the $115 million issued to do the first financing of its primary system. Incidentally, the last of these earlier highway bonds will be retired in about three years.



acific Gas and Electric Co. Station "P"—Steam Plant, San Francisco, alif. Engr.—Stone & Webster Engineering Corp., Boston, Mass., ontr.—Stone & Webster Engineering Corp., San Francisco, Calif. ozzolith Ready-Mixed Concrete supplied by Readymix Concrete Co., d., San Francisco, Calif. Master Builders Embeco and Metallic Hardener so used. (See products' use below.)

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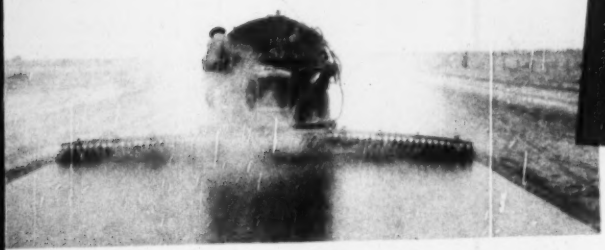
CLEVELAND 3, OHIO — TORONTO, ONTARIO

Road-building with Texaco in aggregate-poor areas

Laying 4 inches of Texaco Asphaltic Concrete paving, containing low-cost local aggregate, on State Highway 29 in Texas.



Applying a hot seal coat of 175-penetration Texaco Asphalt to the asphaltic concrete surface.

Crushed gravel, heated to 375° F. is spread and rolled into the asphaltic seal coat.

Completed Texaco Asphalt pavement on 12 miles of Texas Route 29, constructed by J. M. Dellinger, Inc. of Corpus Christi.

Along the Gulf Coast of Texas, the only local aggregate for highways is caliche, a relatively soft material, and sand. How these low-cost materials were used to construct 12 miles of state highway will interest road builders in other aggregate-poor areas.

For a subbase, caliche was laid to a compacted thickness of 7 inches. Over this was constructed 4 inches of Texaco Asphaltic Concrete—caliche and sand plant-mixed with a 90-penetration asphalt. To compensate for the soft caliche, a seal coat of 175-penetration Texaco Asphalt was applied and covered with heated, crushed gravel, the only imported aggregate used.

The caliche subbase was primed with Texaco MC-1 Cutback Asphalt. Tack coats of Texaco RC-2 Cutback Asphalt were applied between the three or four layers of asphaltic concrete.

Whatever your own road, street or airport paving problem, you will find an effective, economical solution in Texaco's complete range of Asphalt Cements, Cutback Asphalts and Slow-curing Asphaltic Oils. Refined from selected crudes, Texaco Asphalt products have helped construct and maintain America's highways for 45 years.

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